Ex. 1

Magers and Hart Expert Report

Environmental Resources & Impacts Review
Rio Grande River
River Segments - Mile 275.5 to 610.0

June 14, 2024

Prepared For:

State of Texas
Office of the Attorney General ("OAG")
Post Office Box 12548
Austin, Texas 78711-2548

Prepared By:

Christine Magers, CWB
Ecology Program Lead, Principal
Balcones Field Services, LLC

Cassandra "Sandi" Hart, M.S.
Director of Applied Science & Planning
Southwestern Division - Senior Project Scientist
Coastal Environments, Inc.

Executive Summary

The reports provided by experts for Plaintiff in this case failed entirely to assess the environmental impacts of potential actions proposed to enable or enhance commercial navigation in the Rio Grande River. In addition, the reports provide inadequate specifics required to conduct a complete assessment of all the serious environmental and other regulatory issues that such actions would face if an effort were ever made to implement them. However, even lacking these details, it is apparent that the nature and scope of these potential actions would present serious and likely impossible to overcome environmental and regulatory obstacles. We conclude that these potential actions would not be practically feasible for many reasons discussed in this Report.

Adding sufficient water to the flow of the Rio Grande River to permit commercial navigation up and down the river in the segment from RM 275.5 to RM 610.0 alone would require, at a minimum: (1) changing the treaty priorities for water use in the river so as to adversely impact municipal, agricultural, and industrial water users on both sides of the border: (2) breaching or condemning existing and long-honored water rights; and (3) mitigating extensive and serious environmental impacts. Our opinion is that the proposed actions are not "reasonable improvements" and cannot be justified based on potential environmental resource impacts as set forth in this report. In addition, the notion of the federal government proposing to prioritize the use of water for navigation above the use for drinking water and agricultural use in a river basin experiencing dwindling water availability, in our opinion, is absurd.

Based on the research detailed herein, raising the water level through releases, dredging, or a lock and dam system would cause significant impacts to several natural resources in the API:

- Land Use
- Tributaries and Reservoirs
- Wetlands
- Floodplains
- Farmlands
- Threatened and Endangered Species
- Cultural Resources

Under all three methods for increasing navigability in the API there would be a significant impact to border security and operations. The existing fencing, gates, patrol areas, cameras, and other border security related infrastructure would need to be relocated to adjust to the change in water in the river. This would require a significant financial investment to move and rebuild infrastructure in order to maintain border security.

Based our research there are many users in Mexico and the U.S. who depend on the water in the API for domestic and municipal uses, agriculture and stock-raising, electric power, and other

industrial uses. The anticipated environmental and social impacts that would occur from reprioritizing navigation above these uses would be significant.

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1.0 Summary of Background/Qualifications

Christine Magers, CWB has been providing regulatory permitting and NEPA services to clients for almost 20 years across the U.S. Her experience includes NEPA analysis through CE/EA/EIS; Section 408/404/401/10 permitting; feasibility studies; and wetland delineations and mitigation. She has served as the lead or assisted with numerous private and public projects to identify the natural and human resources, project impacts, plan project routes/locations, and identified local/state/federal permits required for development, funding, and planning purposes. Ms. Magers graduated from Texas A&M College Station with a Bachelor of Science in Wildlife and Fisheries Science in 2005 and started her career in the wildlife and regulatory sector soon after. While working full time, Ms. Magers earned her Master of Science in Environmental Management from the University of Houston Clear Lake in 2011. She served in a project manager role for over ten years and as a program lead managing direct reports and projects for almost another ten.

Cassandra 'Sandi' Hart serves as the Division Director of Applied Science, Southwest Region and Senior Environmental Project Manager with Coastal Environments, Inc in Corpus Christi, Texas with over 20 years of experience in regulatory permitting and NEPA services including CE/EA/EIS; Section 408/404/401/10 permitting; feasibility studies; and wetland delineations and mitigation, natural resources permitting and regulatory compliance, solid waste, stormwater planning and permitting, coastal natural resource management, Phase I, II, and III environmental site assessments, habitat characterizations, wetland delineations and determinations, mitigation planning and monitoring, and formal/informal Section 7 consultations for endangered species. Ms. Hart has worked on projects in the South Texas coastal zone, Houston, Bay City, Galveston, Dallas, Austin, Brownsville, Rio Grande Valley, and Louisiana. She has completed coastal projects involving USACE Individual/Nationwide/Regional General, and LOP permits, and TGLO coastal lease and easement acquisitions. She also has significant experience coordinating with State and Federal natural resource agencies and conservations groups including the TCEQ, TPWD, USFWS, NMFS, EPA, THC, and TxDOT. Ms. Hart graduated with a Bachelor of Science and Master of Science in Marine Biology from Texas A&M-Corpus Christi in 1997 and 2000 respectively.

All opinions expressed herein are based our education, background, knowledge and experience in environmental assessment and regulatory permitting. A true and correct copy of our qualifications and experience are shown in our resumes including professional experience, education, and a list of publications and presentations is included in Appendix E. Neither of us has testified as an Expert in the previous four years.

2.0 Summary of Expert Opinions

Based on review of four expert reports provided by the Department of Justice, they did not assess the environmental impacts of their proposed actions. Based on each experts stated qualifications and reports, only Adrian Cortez is qualified to assess the hydrologic effects of the environmental impacts of his proposed action.

3.0 Review and Opinion of the Cortez, MacAllister, and Timmel, and Johnson Expert Reports

Adrian Cortez

Mr. Cortez is stated to be an expert on operation of Amistad and Falcon International Dams and Reservoirs and the flow regime in the area downstream of Amistad International Dam, how the 1944 Water Treaty addresses the subject of navigation, current navigational uses of the Rio Grande within the responsibility of the Commission, and how this could be prioritized in the future within the stretch of river extending from Amistad International Dam to Falcon International Dam and Reservoir.

Based on the expert report provided by Mr. Cortez he is a qualified expert on the U.S. operation of the dams and reservoirs and hydrology. However, he is not qualified to assess the environmental impacts of his suggested actions. Absent in his report was representation of Mexico's use of the water if releases were made to increase navigation and environmental impacts related to the releases. Release of water to increase navigation would likely affect the federally endangered Texas Hornshell (*Popenaias popeii*) and proposed endangered Mexican Fawnsfoot (*Truncilla cognata*), Salina Mucket (*Potamilus metnecktayi*). Critical habitats for these species are in the subject waterway and these species live in shallow, slow-moving waters, and waters with very specific characteristics prevalent in this stretch of the Rio Grande. Increasing water releases would increase the depth and speed of the water in these species' critical habitat areas.

His report also lacked consideration for impacts to human/socioeconomic resources. According to International Boundary and Water Commission (IBWC) weekly data sheets showing the status of Mexico's Rio Grande Deliveries in the current cycle and past cycles back to 1997, Mexico is often in a deficit delivering their allotment of water to the river. And from a report analyzing the water deliveries "The 2013 Basin Study notes that Mexico has not always fulfilled its water delivery obligations under the 1944 Treaty due to drought and its own competing uses for tributary waters." To accurately describe the ability to change priorities of water use in the subject area an expert should consider the impact of all parties controlling release of and use of the water that provides the mode for navigation. In addition, the ability to provide releases from Amistad Dam to provide enough water flow to support reliable navigation of any vessel in the subject area did not consider that nearly half of those releases would be taken by Mexico for their priority water uses, which may not include navigation, but are likely for human use for agriculture and for drinking water. Prioritizing navigation over these uses could have a negative impact to human health and have multiple socio/economic impacts. This contradicts the intent since navigation is the fifth priority water use according to Article 3 of the 1944 Water Treaty. Article 3 of the 1944 Water Treaty Act states: "In matters in which the Commission may be called upon to make provision for the joint use of international waters, the following order of preferences shall serve as a guide:

1. Domestic and municipal uses,
2. Agriculture and stock-raising,
3. Electric power,
4. Other industrial uses,
5. Navigation
6. Fishing and hunting,
7. Any other beneficial uses which may be determined by the Commission."

On page 35 of his report, he states, "One of the primary and critical uses of watercraft is the collection of flow data at all operating ranges of the river from drought to flood." During my site visit on June 5, 2024, the Texas Department of Public Safety (DPS) airboat operators (Josh Kelly and Mike McCale) stated they have no issues navigating the subject waterway until they get to the rocky/falls area south of Eagle Pass. The boat used during our site visit with DPS was an 18 ft or 20 ft American Ranger airboat. According to the FAQs on the website of the manufacturer, American Airboat Corporation, "All AirRangers can [go across land] but many airboats are under-powered or use mismatched engine-prop combinations resulting in poor performance on land. There is more surface friction on land so additional power (torque/thrust) is required. This is achieved four ways." No specific draft for this type of boat is listed by the manufacturer but based on this FAQ answer the draft is assumed to be 0-inches of water needed but the ability for the boat to go on land, or in 0-inches of water, depends on the land surface and engines power. Meaning that even the shallowest draft type of vessel used on the water in the subject area is not used by DPS to navigate below that section. The collection of flow data may and could be conducted by an airboat if there is low enough land friction and it has an appropriately powered engine. The flow data could also be collected by non-watercraft means, such as additional gauges, that would have fewer environmental impacts than increasing the water for navigation to ensure there is enough water to reduce land friction for an airboat to navigate through the subject section of the Rio Grande.

Mr. Cortez statements on page 36, Section 9, appear to suggest the ability to amend the 1944 Water Treaty to make navigation a higher priority use would be relatively easy. However, I did not find that Mr. Cortez provided support for this contention. According to the treaty an amendment requires agreement from both governments. With the history of Mexico's inability to provide their water allotment for the current priority water uses, the probability of such an amendment being approved by both countries should be considered low and not a reliable way to increase the navigability in the subject reach of the river. By his own report, this is unlikely based on the language I've underlined in this sentence "If Falcon has sufficient storage to capture water release from Amistad Dam, and this water is required for beneficial use by downstream users, operations could be planned to allow seasonal navigation of this stretch of the river." Even with those assumptions made, Mr. Cortez only states that seasonal navigation could be supported. Seasonal navigation, however, could not support a reliable navigational waterway that is likely to be a lower environmental impact or cost-efficient mode of transportation of goods and people than other current transportation uses. As stated on page 35 of Mr. Cortez' report the boats used in the subject section of the Rio Grande include:

> "1) 1 - John Boat, ~8ft wide and 20ft long, use it for inspections, use it on Rio Grande and Arroyo Colorado (depth varies)
> 2) 1 – John Boat, ~8ft wide and 15ft long, use it for inspections, use it on Rio Grande and Arroyo Colorado (depth varies)
> 3) 1 – AirRanger Rhino Airboat, ~11ft wide and 30ft long, use it for inspections, use it on Rio Grande and Arroyo Colorado (depth varies)
> 4) 1 – 1925 Pacific Boat, ~11ft wide and 30ft long, use it for inspections, use it on Rio Grande and Arroyo Colorado (depth varies)"

And if current flow in the subject reach is sufficient for the navigation by the watercraft stated in the report and listed above, why would either government support increasing waterflow to increase navigation for other uses that could have environmental and human resource impacts?

In review of Mr. Cortez's provided qualifications and professional experience, he did not show qualifications specific to navigation as listed in his report:

- how the International Boundary and Water Commission (Commission) operates in this stretch of the river to meet its mission, particularly as it relates to navigation.
- current navigational uses of the Rio Grande within the responsibility of the Commission
- how this could be prioritized in the future within the stretch of river extending from Amistad International Dam to Falcon International Dam and Reservoir

His experience is clearly stated in water flow in the subject portion of the Rio Grande, managing the Amistad and Falcon reservoirs for binational use, reporting on river and reservoir levels an using this information to manage the Commission's duties related to the treaty. However, this experience relates to the flows and water level data in general, not specific to its use for navigation. Nor did he provide qualifications or experience changing the priority uses of the water per the 1944 Treaty.

In review of Mr. Cortez's qualifications and professional experience, he did show qualifications specific to these topics addressed in his report:

- operation of Amistad and Falcon International Dams and Reservoirs
- the flow regime in the area downstream of Amistad International Dam
- how the 1944 Water Treaty addresses the subject of navigation

Benjamin Johnson
Mr. Johnson is stated to be an expert regarding the historical uses of the Rio Grande, particularly in the vicinity of present-day Eagle Pass, Texas-Piedras Negras, Coahuila. Based on his provided resume, expert report, and sources cited as reviewed in the report, Mr. Johnson is a qualified expert in his stated subject. There was no support provided to show he is qualified to review environmental resources or impacts to them. In reviewing his report, I noted certain statements that require additional research to document environmental resource impacts and statements that, as presented, could be misleading or are irrelevant to the subject.

On page 11 of his report in the last sentence of first paragraph he provided this statement from his source – "But there were no settlements on the river upstream from Presidio, and thus no markets or supplies for good, and thus no reason for Rackliffe to have extended his freighting networks that far upriver." Then on page 13 of his report he quoted this statement from his source - "Policial disruption and violence, rather than the physical characteristics of the river itself, hampered the success of Rackliffe's business….". These are conflicting statements to pull from a source to describe historic navigability and the second statement was refuted by his own report in several descriptions that call out the falls as impediments to historic navigation, a few examples of these impediments are listed below.

- Page 15 "The expedition reported that the main obstacles were Kingsbury Falls/Las Isletas, downstream of Eagle Pass-Piedras Negras."
- Page 15 "The only natural obstacle he foresaw were Kingsbury Falls, which in 1850 he wrote that "I hope the engineers have cut . . ."
- Page 16 "Smith determined that clearing obstructions below Laredo and the Kingsbury Falls/Las Isletas rapids shortly downstream of Presidio del Rio Grande would "open the river to the largest steamers on it year-round."

His statements on cost and expenditure on page 16 of his report lack necessary information, including the cost of NEPA documentation or even consideration for environmental impacts of the improvements. "They estimated the costs for such improvements to be $25,760. As measured by a proportion of gross domestic product, this sum would be a bit over $18 million in 2024. It is well within the range of appropriations regularly made by the federal government for the improvement of rivers and harbors in the nineteenth century." $18 million may be well within the appropriations range, but it is not nearly enough to cover the cost of such a project. For example, the cost of the Brazos Island Harbor (BIH) Channel Improvement Project Final Integrated Feasibility Report–Environmental Assessment was estimated by United States Army Corps of Engineers (USACE) to be $279,817,000. That project is for the deepening of an existing waterway currently used for commercial navigation that has existing dredge placement areas. It would be more correct to use the USACE approved HarborSym Model as part of a USACE Feasibility Report for the proposed methods of changing navigation in the subject reach of the Rio Grande. This model is used to adhere to National Economic Development (NED) Procedures. The NED Procedures include calculating benefits to project costs and the Feasibility Report also evaluates environmental resource impacts and mitigation. Later, in page 16 of his report he states "Expenditures of these magnitudes to improve the navigability of waterways were commonplace…" In the early 1900s yes – but that statement isn't applicable now due to the availability of other transportation systems which developed because using the river wasn't a reliable mode of commercial transportation per his statement at the bottom of page 16 "…. the economic development above the falls 'was too unsure to warrant the cost." Further supported by the statement on page 20 - "'that in time the resources of the country will be sufficient to justify its connection by railroad with San Antonio or Brownsville, in which event the improvement of the navigation of the river will become of minor importance."

Captain John Timmel

Captain Timmel is presented as an expert on the impact, if any, that the marine floating barrier installed in the Eagle Pass, Texas section of the Rio Grande has upon the navigable capacity of that waterway. His report is clearly stated to only focus on the navigational impact of the buoys, "I was being retained to review and analyze the situation, circumstances, and evidence described in Section III [III. CASE SUMMARY] and IV [IV. DISCUSSION & BASES OF OPINIONS] of this report, and to render opinions as to the impact, if any, the marine floating barrier installed in the Eagle Pass, Texas section of the Rio Grande has upon the navigable capacity of that waterway." In review of Captain Timmel's qualifications and professional experience, he did not show qualifications specific to these topics addressed in his report:

- review and analyze the situation, circumstances, and evidence described in Section III [III. CASE SUMMARY]

- IV [IV. DISCUSSION & BASES OF OPINIONS] of this report
- to render opinions as to the impact, if any, the marine floating barrier installed in the Eagle Pass, Texas section of the Rio Grande has upon the navigable capacity of that waterway

Captain Timmel's Case Summary stated that "The U.S. Department of Justice is seeking a determination of whether the marine floating barrier impacts navigation and navigable capacity and, if so, how." The correct summary of the case is provided in the order "On July 24, 2023, the United States filed this civil enforcement action against Texas under Sections 12 and 17 of the Rivers and Harbors Appropriation Act of 1899, 33 U.S.C §§ 406 and 413 (the "RHA"). (Dkt. # 1.) The United States alleges that Texas violated Section 10 of the RHA, 33 U.S.C § 403, by (1) erecting a structure in the Rio Grande River without authorization from the United States Army Corps of Engineers (the "Corps"), and (2) creating an obstruction to the navigable capacity of that waterway without affirmative Congressional authorization. (Id. ¶ 2.) Through the instant action, the United States aims to enjoin Texas from further constructing or maintaining structures or obstructions in the navigable waters of the United States, except in compliance with the RHA and other applicable law. (Id. ¶ 35.) The United States also seeks to compel Texas to remove all such extant structures and obstructions in the Rio Grande River at Texas's own expense."

Captain Timmel's discussion and bases of opinions section and opinion rendered section did not show that he is an expert able to render opinions as to the impact, if any, the marine floating barrier installed in the Eagle Pass, Texas section of the Rio Grande has upon the navigable capacity of that waterway. This opinion is further discussed below.

On page 5 of his report his stated experience and qualifications includes many waterways, none of which are the subject waterway or its tributaries. And his comparison to the Alafia River because it was a narrow shallow river that was dredged to accommodate larger vessels for commercial use "…just as the Rio Grande could be." lacks analysis of the environmental impacts of dredging to accommodate larger vessels. Suggesting that the Rio Grande could be dredged to accommodate larger vessels for commercial use is unfounded due to the lack of existing facilities near the river that have infrastructure to move goods by water or the demand for movement of commercial goods from this area to another area along the river within the subject area. To create such a demand would entail a large environmental impact from the creation of commercial and industrial facilities on the riverbank, including required docks, bulkheads, dolphins, increased stormwater runoff, and frequent maintenance dredging to maintain operations.

Including reference to the Admiralty Sailing Directions as information for rivermen is not relevant to the subject, as it is for ocean going vessels. Referencing the U.S. Coast Pilot 5 is only relevant for definitions stated but is not relevant as a source for navigational uses by riverman. Mentions of the Rio Grande in this source relate to Gulf of Mexico navigation to the mouth of the river. In fact, this source states "No survey of the river has been made recently, but access to the river over the entrance bar is limited to skiffs and small boats; inside, the channel is changeable. The International Boundary Commission has several dams on the Rio Grande to prevent freshwater from wasting into the Gulf." This statement clearly shows that navigation above the river entrance is limited to small boats.

On page 14 of his report, he states "….no Local Notices to Mariners (LNMs) or Broadcast Notices

to Mariners (BNMs) have been issued regarding the marine floating barrier, or for any issue in the Eagle Pass, Texas, section of Rio Grande." This reference supports the buoys not being a navigational hazard. Referencing this source as a place to find navigational hazards in the subject section of the river is also irrelevant because the USCG District 8 Marine Safety Unit only covers waterways 50 miles inland which by river mile or direct from the coast falls far south of Falcon Dam and reservoir far outside of the subject study area on the Rio Grande River. Further, if the buoys were of navigational concern to the USCG they could mark them and charge the owner of the buoys the cost of marking, which to my knowledge has not occurred. No additional markers or lighting was observed during my site visit on June 5, 2024. The buoys themselves are bright orange and highly visible. The banks on either side of the buoys are not public access areas. The airboat used on our site visit on June 5, 2024, was able to navigate safely completely around the buoys, getting within 20 feet of the buoys at times. Several of the concrete blocks were visible above the water and they were located within a few feet of the bright orange buoys.

On page 28 of his report, Captain Timmel states the buoys have made the U.S. side of the river inaccessible to U.S. citizens and that the center of the river is usually the deepest part of the river. Neither statement is correct. We, U.S. citizens, were able to navigate entirely around all sides of the buoys on our site visit. The boat captain was asked if the buoys affected their ability to navigate this part of the river and stated firmly that they did not. On our site visit to several segments of the river there were many natural rock bars, islands, debris, bridge supports, and floating vegetation in the middle and other parts of the river making those areas shallower. It's also worth noting that because of the nature of this river having many rock bars and islands they present more of a navigational hazard than orange buoys because rock bars move often, can be just below the water surface hard to see, and are unmarked. His report did not consider this natural setting. As the captain points out in his report, it is the captain's responsibility to be familiar with the waterway they are traversing. Therefore, it would be safe to assume any captain on this water would know about the potential for hazards such as unmarked rock bars and debris and would be moving at appropriate speeds to avoid allisions which would also mean they should be moving at a speed that would allow them to safely navigate around the stretch of bright orange buoys.

His report did not consider any environmental effects of the buoys being left in place or removed. If left in place long enough, the buoys could have a positive effect to the bank by reducing wave action which could allow the bank erosion that was visible during the site visit to slow.

In the last full paragraph on page 31 – I believe the second sentence, "Being securely moored to the bottom of the river with chains and wire cables to approximately 158 tons (316,500 pounds!) of concrete blocks hardly qualifies it as a temporary structure." is false because it took 2 weeks to place the buoys and since being placed, they were shifted 1,000 feet. Identifying the buoys as a permanent structure has implications for permitting and environmental resource impact assessments. Environmental resource impacts from temporary structures are temporary and can be replaced and repaired after the removal of the structure whereas environmental resource impact from permanent structures is considered permanent and require mitigation and compensation. In addition to the lack of evidence for his stated expertise discussed above, his report should have included, but did not, the environmental resource impact considerations for determining the appropriate permits and applicable regulations.

Chief Timothy MacAllister

Chief MacAllister is presented as an expert on Rio Grande Navigation and Reasonable Improvements to Incrementally Improve Navigation on River Miles 275.5 to 610.0. Based on the information provided in his report and the opinions he formed based on his research, he did not consider environmental impacts from his suggested improvements.

His stated opinions from his report are:

- "a. The Rio Grande, between river miles 275.5 to 610.0, has sufficient water flows to support navigation of the waterway by Class A and Class I vessels.
- b. The Rio Grande, between river miles 275.5 to 610.0, is presently navigated by Class A and Class I vessels.
- c. Reasonable improvements can be made to the Rio Grande, between river miles 275.5 to 610.0, to enhance and incrementally improve navigation."

Based on the information provided in his report, Chief MacAllister did not provide evidence to show he is an expert in any of his three opinions. He did not provide flow data to support his claim that there is currently "sufficient flow". He did not provide evidence that the Rio Grande, between river miles 275.5 to 610.0 is presently navigated by Class A and Class I vessels. He did provide information about navigation in other waterways that are not similar to this reach. And he did not provide evidence that he is qualified to determine that the reasonable improvements suggested are, in fact, "reasonable", or to what extent those "reasonable improvements" would "enhance and incrementally improve navigation". Impacts to environmental resources under any reasonable improvement should be considered but were not considered in his report.

Throughout his report Chief MacAllister references waterways that are dissimilar to the environmental setting of the subject portion of the Rio Grande – differing in water in-flow, water velocity, riverbank and bottom material, water way adjacent infrastructure, and different in priority uses of the waterway. Examples of these dissimilar waters include his experience on Belton Lake; comparison of water releases on Sam Rayburn Reservoir, Town Bluff Reservoir, and Lewisville Lake; and use of releases by kayakers on Elm Fork.

Regarding opinion a. and b., it has been documented by the other expert reports that the area known as Kingsbury Falls and other areas with a high amount of exposed bedrock, rock bars, islands, and falls during normal flow have and still do restrict navigation between those river miles. When asked if the airboat could take us to Kingsbury Falls during my site visit on June 5, 2024, the boat captain stated that he could not get past the bedrock/rocky areas in the boat, which as stated previously can go on land with a draft of 0 inches with appropriate engine power and low enough land surface friction. It was suggested that we'd be able to survey that location by helicopter. Note that during our site visit the river was noted by the boat crew as being slightly higher than normal (estimated at 2 ft higher) but we would not be able to get to the Kingsbury Falls area by airboat. Additional water releases from Lake Amistad for higher priority water uses by the U.S. and Mexico could temporarily make this section navigable by Class A and Class I vessels but it could also have environmental impacts to protected species, the banks of the river, instream and bank vegetation, and wildlife. Protected species that may occur in the API include Gulf Coast Jaguarundi (*Puma yagouaroundi cacomitli*), Tricolored Bat (*Perimyotis subflavus*), Cactus Ferruginous Pygmy-owl (*Glaucidium brasilianum cactorum*), Golden-cheeked Warbler (*Setophaga chrysoparia*), Piping

Plover (*Charadrius melodus*), Rufa Red Knot (*Calidris canutus rufa*), Southwestern Willow Flycatcher (*Empidonax traillii extimus*), Devils River Minnow (*Dionda diabol*), Fountain Darter *(Etheostoma fonticola*), Mexican Blindcat (catfish) (*Prietella phreatophila*), Rio Grande Silvery Minnow (*Hybognathus amarus*), Mexican Fawnsfoot (*Truncilla cognata*), Salina Mucket (*Potamilus metnecktayi*), Texas Hornshell (*Popenaias popeii*), Monarch Butterfly (*Danaus plexippus*), Ashy Dogweed (*Thymophylla tephroleuca*), Star Cactus (*Astrophytum asterias*), Walker's Manioc (*Manihot walkerae*), and Zapata Bladderpod (*Physaria thamnophila*). Additional information on these protected species and potential impacts are discussed further in the provided Environmental Resources Review Report.

There is an error in his report on page 5. On page 5 the text above the pictures says class I is less than 26 feet and the text under the pictures says Class I are vessels 16 to 20 feet. 26 feet is correct.

On page 6 Chief MacAllister states “Navigation of the Rio Grande River between river miles 275.5 to 610.0 can be enhanced by various means to include: Timing water releases for all project purposes to take advantage of other inflow opportunities such as high inflows from the watershed and hydropower needs.” This statement is misleading because water releases for higher priority uses of the subject waterway could only temporarily be used to improve navigation and it would not be a predictable or reliable way to improve navigation, to increase navigation for larger classes of vessel, or regular commercial use. He did not consider environmental and human/socioeconomic impacts from additional water releases that could affect protected species and reduce water for human consumption.

His opinion statement c. was not substantiated by the information provided in his report. To substantiate this opinion there should be locations in the subject study area that could be dredged, a proposed amount of dredge that would be required to increase navigation, a place for that material to go once removed, information on how often those areas would need to be maintenance dredged to maintain the desired level of navigation, and the environmental impact and public funds that would be associated with dredging. As stated in Johnson’s report there are many rocky and fall areas that restrict navigation between Eagle Pass and Laredo. Not even airboats can go over bedrock and falls without damaging the boat and endangering the occupants of the boat. This is supported by the boat captain's statement that he could not get me to Kingsbury Falls in the airboat due to the rocky areas on site visit on June 5, 2024. Based on Johnson’s report and our research these rocky areas are likely the location of many historic crossings such as the Camino Real, or Old San Antonio Road, near San Juan Bautista at the site of present Guerrero, Coahuila. Dredging in this area could impact many cultural and historic resources.

4.0 Introduction

The United States of America (USA) is proposing to improve navigation on the Rio Grande between river mile segments (RMs) 275.5 and 610.0. This section of the Rio Grande includes the stretch of the river near Eagle Pass, Texas, where the state of Texas installed an approximately 1,000-foot floating barrier comprised of buoys. According to the four expert reports provided by the U.S. Department of Justice, the USA is considering improving navigation within this section of the Rio Grande by releasing more water from Amistad reservoir or dredging the river.

Due to the lack of environmental resource impact considerations for the proposed navigational

changes we have prepared this report to document the environmental and social resources that would be impacted. This report outlines the data, information, modeling, and studies that would be necessary to determine environmental impacts associated with these proposals. Additionally, no regulatory permitting or environmental impacts information has been provided by the USA or their experts.

Our assumptions used to develop this report are discussed in the report below and detailed in the resource section. Sources that were used to develop this report are listed in the reference section of this document.

We have been asked by the Office of the Attorney General (OAG) of the State of Texas to provide information relating to the environmental impacts of the proposed navigational improvements. To assess potential environmental resource impacts quantitatively and qualitatively, we have assumed an area of potential impact (API) of 0.5-mile-wide along either side of the Rio Grande within the Fort Worth U.S. Army Corps of Engineers District (USACE). However, no resource data for the API within Mexico was readily publicly available; therefore, this discussion is focused on the U.S. side. The API was developed from extracting the Rio Grande line data from the U.S. Geologic Survey's (USGS's) National Hydrography Dataset Best Resolution (NHDD) for the state of Texas (USGS, 2023) and creating river miles according to U.S. survey miles. The API totals approximately 119,644 acres in Mexico and the U.S. and extends across five counties in south Texas: Zapata, Webb, Maverick, Kinney and Val Verde.

Note that all resources reviewed in this report are based on publicly available information that was generally only available for the U.S. side of the river. Because both sides of the river would be impacted by changes to improve navigation in the API, a bi-national research effort that includes assessing impacts to resources in both countries by experts familiar with resources and regulations in each country should be conducted in addition to this informational report or through the formal National Environmental Policy Act (NEPA) documentation process.

5.0 Navigational Improvement Assumptions

No exact project footprints were defined in the four USA provided expert reports. However, based on those reports and input from OAG counsel and their expert witnesses, a defined API was identified for the review of environmental resources, associated potential environmental impacts, and regulatory permitting for the three assumed impacts listed below within the API. This report does not include extended review of navigation from an engineering viewpoint, commerce, water rights, safety/security concerns, or historical navigation (other than impacts as associated by actions). Please refer to additional OAG expert witnesses' reports for further information on those subjects.

5.1 Assumption 1 – Depth Control via Water Releases

Assumption 1 reviews environmental impacts and regulatory permit considerations for raising and maintaining the water levels in the API to depths of 9 to 12 feet and width of 100 to 125 feet by increasing releases from Amistad Reservoir. This depth and width of dredging was assumed based on expert reports that claim the Rio Grande River could be used for navigation and commerce similar to the Gulf Intracoastal Waterway (GIWW), a 1,100-mile-long man-made waterway that typically measures 125-feet-wide and 12-feet-deep and extends along the Gulf of Mexico from St.

Marks, Florida, to Brownsville, Texas (Texas Department of Transportation [TXDOT], 2013). This includes the assumption that there would be enough water in the Rio Grande River system to produce this level of water whether, or not, this is true. Hydraulic analysis was not provided by the USA experts to support their proposed action that there was enough water in the system to increase releases enough to change and maintain navigation while not impacting higher priority (priorities per the 1944 Water Treaty) water uses by Mexico and the U.S. If this assumption is carried forward, detailed hydraulic analysis proving the availability of water would be required to complete a feasibility analysis with benefit cost analysis and environmental impact statement. Additionally, Indirect and Cumulative Impacts would need to be assessed as this assumption would have an impact on waters and other natural resources upstream and downstream.

5.2 Assumption 2 - Dredging

Assumption 2 reviews the environmental impacts and regulatory permit considerations to establish and maintain the same depths and widths as Assumption 1. However, Assumption 2 assumes the dimensions would be obtained by dredging in low areas within the API, regularly conducting maintenance dredging, and placement of dredge material from construction and maintenance. This assumption is based on USA expert reports that suggested dredging to increase navigation in the API. Calculations about the locations and amount of dredge required to increase navigation were not provided by the USA experts. These calculations, along with where the dredge would be placed, and how often it would require maintenance dredging would be required to complete a feasibility analysis with benefit cost analysis and environmental impact statement if this proposed action is carried forward. Indirect and Cumulative Impacts would need to be assessed as this assumption would impact waters and other natural resources upstream and downstream.

5.3 Assumption 3 – Locks & Dam System

Assumption 3 reviews environmental impacts and regulatory permit considerations for creating a system of locks and dams proposed by OAG expert Ancil Taylor, within the API and beyond to connect the API to the Gulf of Mexico through the river or by a proposed connection to the Brownsville ship channel. The model he created sketches out a system of locks and dams that would hypothetically make commercial scale navigation feasible in the Rio Grande. The model makes several assumptions such as how deep the river channel would need to be (9 feet), how many locks and dams would need to be constructed along the reach to accommodate commercial vessels (31), bottom channel width (150 feet), and more. See Mr. Taylors report for a full explanation of this proposed assumption and details. If this proposed action is carried forward detailed analysis would be required to complete a feasibility analysis with benefit cost analysis and environmental impact statement. Indirect and Cumulative Impacts would need to be assessed as this assumption would impact waters and other natural resources upstream and downstream.

5.4 No Action Assumption

The No Action Assumption would consist of leaving the floating buoys in place with no changes for navigation. Existing watercraft types would continue to utilize the Rio Grande within the API. Under this assumption, no changes to the 1944 Water Treaty would be required to re-prioritize water uses to raise navigation as a higher priority. Also, no impacts to natural resources would occur from raising water levels, dredging, or installing a lock and dam system. Therefore, no further analysis, modeling, engineering and design, NEPA documentation, or the expenditure of public funding to pay for those efforts would be required. If the river segment containing the buoys

is determined to be a navigable waterway, subject to the jurisdiction of USACE and the EPA, and the Texas Governors Declaration of State of Disaster does not supersede that jurisdiction then an individual permit application from Texas may be required to authorize the placement of the temporary buoys in the river.

6.0 Regulatory Framework

The International Boundary and Water Commission (IBWC) is responsible for applying the boundary and water treaties between the U.S. and Mexico and settling differences that may arise in their application. The IBWC was established in 1889 and consists of two independently operated sections, the U.S. and Mexico sections, each headed by an appointed Engineer Commissioner. The IBWC's authority was further expanded by the 1944 Treaty stating that joint action by the two governments must go through the Department of the State (United States) and the Secretariat of Foreign Relations (Mexico) (IBWC, 2024).

For purposes of Section 10 of the Rivers and Harbors Act of 1899 (Section 10), navigable waters of the U.S. are those waters that are subject to the ebb and flow of the tide and/or are presently being used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce (33 CFR 329.4). Navigable waters include lakes and other on-channel impoundments of navigable rivers. Under Section 10, USACE regulates any work in or affecting navigable waters of the United States. Based on the *Navigability Study: Rio Grande, Tributaries, and Lakes, Rio Grande Basin, River Mile 275.5 to 610.0* (USACE, 1975), the USACE Fort Worth District, determined the Rio Grande River, on the United States side from the centerline of the normal channel, from river mile 275.5 to 610.0 is a navigable water of the U.S. (Section 10 water); that Falcon Reservoir at and below elevation 296.4 mean sea level (msl) on the United States side from the centerline of the normal channel, is a navigable water of the U.S.; that Amistad Reservoir at and below elevation 1,117.0 msl on the United States side from the centerline of the normal channel, is a navigable water of the U.S.; and that all tributaries to this reach of the Rio Grande on the United States side are non-navigable waters. This reach of the Rio Grande, from river mile 275.5 to 610.0, includes the floating barrier, shown in the picture above, deployed by the State of Texas near Eagle Pass, Texas.

The Rio Grande is within the USACE Galveston District's authority from the mouth of the river at the Gulf of Mexico to river mile 275.5 (Galveston/Fort Worth District's boundary) and within the USACE Fort Worth District's authority from river mile 275.5 to 610.0 (USACE, 1975). According to the USACE's *Navigable Waters of the United States in Fort Worth, Albuquerque, and Tulsa Districts Within the State of*

Texas (2011), the Rio Grande is classified as a navigable water under the Fort Worth and Albuquerque Districts from the Zapata-Webb County line upstream to the point of intersection of the Texas-New Mexico state line and Mexico.

Neither the 1975 or 2011 list of navigable waters in the Fort Worth District includes the tributaries to the Rio Grande which is important because many of them, such as the Devils River and the Pecos River, are navigable by Class A and Class I vessels that were discussed as being used by the USA expert reports as an argument that the section of the Rio Grande in the Fort Worth District is navigable. Due to navigational constraints such as the dams, reservoirs, falls, and higher priority uses of the water in this segment of the Rio Grande, the listing of this segment as a jurisdictional Section 10 navigational waterway should be reviewed.

6.1 Navigability – Texas

The State of Texas navigability falls under two different definitions, *Navigable in Fact* and *Navigable by Statute*.

6.2 Navigable in Fact

According to the Texas Parks and Wildlife Department (TPWD), Texas courts have acknowledged a wide range of uses to support navigability in fact. Proper public uses mentioned as uses of navigable waterways include hunting, fishing, floating logs, boating, and commerce.

Welder v. State, 196 S.W. 868, 873 (Tex.Civ.App. Austin 1917, writ ref'd) discussed the concept underlying the "navigable in facts" tests: "Behind all definitions of navigable waters lies the idea of public utility. Waters, which in their natural state are useful to the public for a considerable portion of the year are navigable. Boats are mentioned in the decisions because boats are the usual means by which waters are utilized by the public, and commerce is usually mentioned because carrying produce and merchandise is the usual public demand for such waters. But floating logs has frequently been held to be navigation, and hunting and fishing, and even pleasure boating, have been held to be proper public uses."

6.3 Navigable by Statute

According to the TPWD *Natural Resource Codes 21.001*, "Navigable stream" means a stream which retains an average width of 30 feet from the mouth of the river towards the headwaters.

Diversion Lake Club v. Heath, 126 Tex. 129, 86 S.W.2d 441, 445 (1935) acknowledged that the waters and stream beds of navigable by statute waterways are "owned by the state in trust for the benefit and best interests of all the people, and subject to use by the public for navigation, fishing, and other lawful purposes".

Motl v. Boyd, 116 Tex. 82, 286 S.W. 458, 467 (1926) defined the area used to determine the navigability by statute as "[T]he bed of the stream defined by the statute is that portion of the terrain between its fast land banks. So, when the statute says that the average width shall be 30 feet between the banks, it does not mean the space covered by the water at low tide or flow, but the entire bed of the stream as above defined.'

Additional information about navigability can be found in the OAG expert reports by Eleftherios

Iakovou, Heather Miller, Carlos Rubinstein, Herman Settermeyer, Fletcher 'Doug' Shields and Ancil Taylor.

7.0 Environmental Resources

7.1 Land Use

Existing land use in and near to the API, including Zapata, Webb, Maverick, Kinney and Val Verde counties is predominately agricultural, with a high percentage of rangeland. Also included in and near the API are urban and suburban residential communities including multiple "colonias" - (Laredo, Eagle Pass and Del Rio). Under all three Assumptions discussed below, there would be a direct impact to border security and operations. The existing fencing, gates, patrol areas, cameras, and other border security related infrastructure would need to be relocated to adjust to the change in water in the river. This would require a significant financial investment to move and rebuild infrastructure to maintain border security.

The total acreage of the five counties crossed by the API is 6,492,160 acres. According to the 2022 United States Department of Agriculture (USDA) Census of Agriculture these counties include 1,628 farms which total 5,232,218 acres, or 81% of the land area for the counties. According to the USDA Web Soil Survey, 38% of the soils in the API are rated as prime farmland, if irrigated (USDA, 2024). A discussion of the farmland and potential impacts is discussed later in this document. The remaining 19% of the land use in the counties includes parkland, tribal land, urban and suburban developed areas, and transportation and utility infrastructure.

7.1.1 Assumption 1 – Depth Control via Water Releases

Implementation of this assumption would have direct impacts on land use, such as to urban and agricultural land uses, in the API. Land adjacent to the river would be inundated by the higher water and land near the river could experience an increased frequency and severity of flooding, rendering them unviable. Land use changes could also occur from the conversion of lands to commercial and industrial uses if those industries develop riverfront property to utilize the waterway for moving products and material on the river as suggested by the USA experts. By reprioritizing navigation as higher priority use of the water in the river that would lower the amount of water available for agricultural use to water farmlands which could make it impossible for some farmlands to continue to be used. The impacts from the loss of farmland caused by this Assumption would be subject to the FPPA. This alternative would have significant immediate and long-term impacts on existing land use within the project vicinity including border security as previously mentioned.

7.1.2 Assumption 2 – Dredging

Implementation of this assumption would result in direct impacts to land and could cause an indirect change of the current urban and agricultural land uses in the API. Dredging would remove sediment from portions of the river that would need to be placed in nearby placement areas. No such placement areas exist, which means that some land will need to be converted from existing land use to placement area use. The areas that would need to be dredged to allow for the projected depth and width were not identified by the USA expert reports; neither were potential locations for the dredged material's placement. Therefore, the amount of this impact is unknown. Placement areas could restrict existing and future land use options as identified in the cities of Eagle Pass

(Eagle Pass Plan, 2005), Del Rio (Del Rio Plan, 2007) and Laredo (City of Laredo Plan, 2017) Master Plans.

Land use changes could also occur from the conversion of lands to commercial and industrial uses if those industries develop riverfront property to utilize the waterway for moving products and material on the river as suggested by the USA experts. By reprioritizing navigation as higher priority use of the water in the river that would lower the amount of water available for agricultural use to water farmlands which could make it impossible for some farmlands to continue to be used. The impacts from the loss of farmland caused by this Assumption would be subject to the FPPA. This assumption would have significant immediate and long-term impacts on existing land use within the project vicinity including border security as previously mentioned.

7.1.3 Assumption 3 – Locks & Dam System

Implementation of this assumption would directly impact land use through inundation or increased flooding. This would result in a change of the current urban and agricultural land uses in the API and surrounding area. The electric and transportation infrastructure required to power and maintain the locks which would impact additional existing land use. Land use changes could also occur from the conversion of lands to commercial and industrial uses if those industries develop riverfront property to utilize the waterway for moving products and material on the river as suggested by the USA experts. By reprioritizing navigation as higher priority use of the water in the river that would lower the amount of water available for agricultural use to water farmlands which could make it impossible for some farmlands to continue to be used. The impacts from the loss of farmland caused by this Assumption would be subject to the FPPA. This assumption would have significant immediate and long-term impacts on existing land use within and near the API including border security as previously mentioned.

7.2 Topography, Geology, and Soils

Topography

The average slope of the river from the base of Amistad Dam (898.3 feet at riverbed) to the base of Falcon Dam (173 feet at the riverbed) along the 245 river miles between them is a 2.96-foot drop in elevation per river mile. Some areas may be steeper or more level than this, but a more in-depth study would be needed to identify these areas. Riverbed elevations at the base of both dams were calculated from the Texas Water Development Board (TWDB, 2024a 2024b). The area within the 0.5-mile buffer on the U.S. side of the channel includes level to slightly sloping floodplains and steep hill sides and bluffs. Topography was evaluated using the USA Topo Map Base map shown in the Topographic Figure in Appendix A.

Geology and Soils

According to USGS all of the geologic formations overlapped by the API are sedimentary from the Lower Eocene, Middle Eocen, Neogene, Paleocene, Quaternary, and Upper Cretaceous (Appendix A). All formations within the 0.5-mile from the river channel are sedimentary. The geology within the API falls into two categories: Unconsolidated Soils and Consolidated Formations:

Unconsolidated Soils

Terrace Deposits
Alluvium

Uvalde Gravel

Consolidated Formations

Salmon Peak Limestone
Buda Limestone
Eagle Ford Formation
Austin Chalk
San Miguel Formation
Escondido Formation

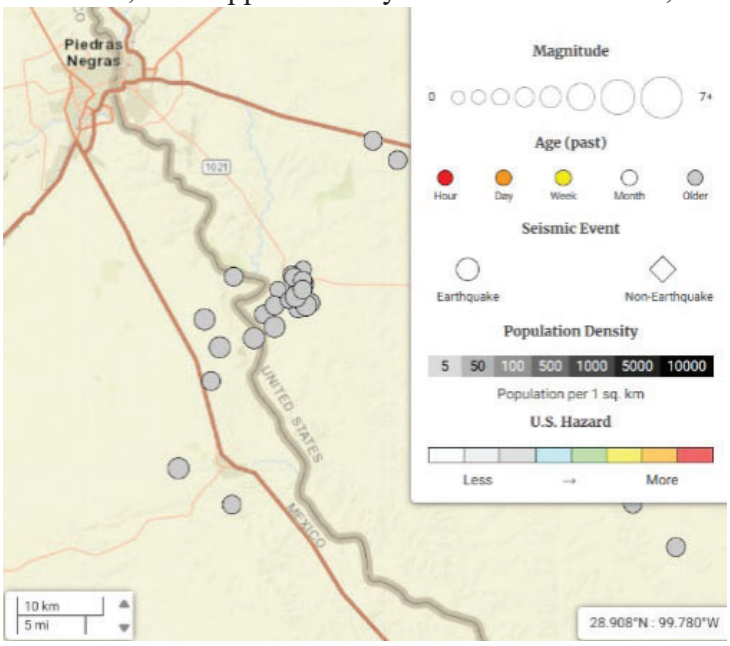
Indio Formation
Carrizo Sand
Bigford Formation
El Pico Clay
Laredo Formation

The upper section of the API, below Amistad dam to river mile 494, has outcroppings of limestone. The presence of limestone brings a risk of sinkholes. Sinkholes have already been documented by IBWC in the limestone above Amistad Dam (Salmon Peak Limestone). The formation at the base of the Amistad dam is Salmon Peak Limestone, and the danger of sinkhole formation is present below the dam due to this formation (IBWC, 2007). The unconsolidated soils within the API are prone to erosion due to these sediments being the youngest deposited sediments in the API. They have not cemented or have limited cementation to form solid formations. Formation identification gathered from State Geologic Map Compilation by the USGS.

There are 63 different soil types crossed by the API. A full table of the soils within the API is included in Appendix B and shown in the Soils Figure in Appendix A.

Faults

As shown in the figure below, within the API, USGS does not show any mapped faults. However, from approximately river mile 432 south, the API is within a fault area. USGS identifies the fault area as Gulf-margin normal faults, Texas – Class B. Class B faults are defined by the USGS as "Geologic evidence demonstrates the existence of a fault or suggests Quaternary deformation, but either (1) the fault might not extend deeply enough to be a potential source of significant earthquakes, or (2) the currently available geologic evidence is too strong to confidently assign the feature to Class C but not strong enough to assign it to Class A."



Earthquakes

The USGS mapping shows several earthquakes that have occurred within an area underlaid by the Eagle Ford Shale in the past ten years. This area lies south of Eagle Pass.

Impacts to geology and soil resources are regulated by the Clean Water Act, Section 402: National

Pollutant Discharge Elimination System through the Texas Commission on Environmental Quality (TCEQ) except for oil, gas, and geothermal exploration and development activities, which are regulated by the Railroad Commission of Texas.

7.2.1 Assumption 1 – Depth Control via Water Releases

Raising the water level of the river could result in areas with limestone outcroppings susceptible to sinkhole development inundated with water causing unintended loss of surface water. A more extensive examination of the areas with limestone outcropping or limestone underlaying the surface soil need to be conducted to identify potential risks.

The raised water level could flow over loose, unconsolidated soils. This could lead to increased erosion of the soil if it is not properly stabilized. Erosion of the unconsolidated soils and transportation by the higher flows needed to increase the water level to allow for commercial vessels could facilitate the transportation of the unconsolidated soils to Falcon Reservoir. This could lead to decreased water storage capacity in the reservoir.

7.2.2 Assumption 2 - Dredging

Dredging could expose sinkholes or make areas with limestone outcroppings susceptible to sinkhole development. A more extensive examination of the areas with limestone outcropping or limestone underlaying the surface soil need to be conducted to identify potential risks.

Dredging of unconsolidated soils could lead to increased erosion of the soils. Unstable banks and silting in of dredged channel could happen if proper bank stabilization is not done. Erosion of the unconsolidated soils and transportation by the increase velocity of the dredged channel to Falcon reservoir could lead to decreased water storage in the reservoir. Placement of the dredged material would remove sediment from the river system and dewatering from the placement area could lead to that sediment running off into other water bodies.

7.2.3 Assumption 3 – Locks & Dam System

Under a lock and dam system, the lock and dams would need an in-depth study done to determine the locations of the locks would be able handle the structures. Two areas are of particular concern: The first would be the upper portion of the API where limestone is present. Any area that has limestone is at risk of sinkhole development. The second is the area south of Eagle Pass. With the presence of earthquakes, all structures would need to be constructed properly to withstand the possibility of an earthquake happening.

7.3 Tributaries and Reservoirs

The hydrology of the Rio Grande River between the Amistad Reservoir and Falcon Reservoir is characterized by a semi-arid climate, with significant variability in streamflow due to both natural and anthropogenic factors (TPWD, 2024c). This stretch of the river runs through the border between the U.S. state of Texas and the Mexican state of Coahuila, traversing a region with limited rainfall and high evaporation rates (Wurbs and Alaya, 2014). Water levels are heavily influenced by upstream releases from the Amistad Reservoir, which serves as a major storage and regulation point. Downstream, the Falcon Reservoir captures much of the river's flow, controlling discharge

into the lower Rio Grande. Along this segment, the river's flow is further impacted by agricultural withdrawals, municipal usage, and return flows, leading to significant fluctuations in water volume and quality.

U.S. tributaries, such as the Pecos and Devils Rivers also contribute to hydrology, albeit with highly variable inflows. Additionally, this section of the Rio Grande is subject to periodic droughts and occasional flooding, both of which can drastically alter the river's hydrodynamic and sediment transport processes. Water management practices between the U.S. and Mexico are crucial in maintaining flow regimes and addressing the challenges of water scarcity and allocation in this transboundary river system. A small diversion power generation dam and irrigation canal, Maverick Canal, is located on the mainstem of the Rio Grande between Eagle Pass and Del Rio. The IBWC Weir Dam is located on the Rio Grande, 6 miles south of El Indio just downstream of Cuervo Creek.

The two international reservoirs and the API cover four HUC-8 watersheds, all straddling the international border are the Amistad Reservoir (HUC ID: 13040212), Elm-Sycamore (HUC ID: 13080001), San Ambrosia-Santa Isabel (HUC ID: 13080002), International Falcon Reservoir (HUC ID: 13080003) hydrologic units as designated by the USGS (Attachment A). The tributaries associated with these watersheds include the following:

- Pecos River
- Devils River
- Evans Creek
- Eagle Nest Creek
- McKees Creek
- Salt Creek
- Cienegas Creek
- San Felipe Creek
- Zorro Creek
- Sycamore Creek
- Pinto Creek
- Cow Creek
- Tequesquite Creek
- Las Moras Creek
- Quemado Creek
- Elm Creek
- Rosita Creek
- Saus Creek
- Indio Creek
- Cuervo Creek
- Tovar Creek
- San Cirilo Creek
- Carricito Creek
- Los Indios Creek
- Pinto Valles Creek
- Chacos Creek
- Dolores Creek

Amistad Reservoir, San Felipe Creek, and the segment of the Rio Grande in the API from 0.41 mile upstream of the confluence of the Arroyo El Lobo (Mexico) in Webb County to Amistad Dam in Val Verde County are listed as an impaired waterbody on the TCEQ 303(d) list (TCEQ, 2022). Amistad Reservoir (Segment 2305) is listed for chloride in water and the Rio Grande (Segment 2304) and San Filpe Creek (Segment 2313) are listed for bacteria in water (recreation use).

The Rio Grande within the API has many instream islands that vary in size and characteristics. Several of these were observed during the site visit by Christine Magers on June 4 and 5, 2024. The islands varied from small rocky mounds rising just above the water level to larger islands with

varying maturity levels of vegetation. The river in the API also has many areas of exposed bedrock that are visible on aerial imagery. During the site visit she noted the segments of the Rio Grande near the international border crossing bridges had eroding banks (shown in the picture on the left) that she did not observe in other portions of the river seen during the site visit. In all portions of the river visited the substrate was noted as gravely and silty with invasive and native species of submerged and emergent vegetation growing in many areas.

More thorough scientific analyses would be needed to quantify the effects that any of the proposed three assumptions would have on the hydrology of the Rio Grande or its tributaries. Impacts to these waters under any of the three assumptions described below would be subject to the regulations of the Clean Water Act (Section 10, 404, and 401).

7.3.1 Assumption 1 – Depth Control via Water Releases

Releasing water to manipulate depth can trigger several environmental consequences. The increased flow velocity resulting from the release can lead to heightened bank erosion along the riverbanks downstream and loss of or movement of the in-stream islands. This erosion can destabilize the banks, altering the landscape and potentially causing damage to surrounding areas and release additional sediment from the instream rock bars and islands. Also, the inundation of riparian areas adjacent to the river due to the rising water levels can result in the loss of or conversion of those riparian features such as wetlands to riverine and loss of the in-stream islands. Additionally, if the release of water continues downstream of Falcon Lake it could inundate resacas, disrupting their hydrologic function. Resacas, crucial for flood control, water storage, and providing habitats for various species, may lose their effectiveness in mitigating floods and supporting local wildlife populations.

7.3.2 Assumption 2 – Dredging

Excavating sediments and debris from the bottom of the river would have significant impacts on river hydrology. Dredging alters the physical characteristics of a riverbed, increasing the depth and changing the flow patterns. This modification can enhance the river's capacity to carry water, potentially reducing the risk of flooding in certain areas. However, it can also lead to unintended consequences such as increased erosion downstream due to the faster flow of water. Sediment transport dynamics are affected as well, with dredging potentially disrupting the natural deposition processes. This can harm habitats for aquatic life, as many species rely on specific sediment conditions for spawning and feeding. Additionally, the removal of sediments can release pollutants that were previously trapped in the riverbed, degrading water quality. Dredging can also impact groundwater interactions, especially in regions where the river and aquifers are closely linked, potentially lowering water tables and affecting water availability. Thus, while dredging can offer benefits for navigation and flood management, it must be carefully managed to mitigate its

ecological and hydrological impacts.

7.3.3 Assumption 3 – Locks & Dam System

Riverine locks and dams can significantly impact ecosystems by altering water temperature, chemistry, and flow, all of which are crucial for maintaining healthy habitats. These structures can warm the water by slowing its natural flow, promoting the growth of things such as harmful algae and parasites, and causing abnormal temperature fluctuations that adversely affect sensitive aquatic species that prefer certain water temperatures for feeding and/or spawning purposes. Dams also change the water chemistry, which can further disrupt the aquatic environment. Additionally, by reducing peak flows, dams prevent the natural formation of pools and riffles, essential habitats for various fish species. Sudden changes in water levels caused by dams can strand fish, while reduced water flow downstream can degrade complex habitats necessary for a thriving ecosystem. Furthermore, dams obstruct fish migration routes between feeding and spawning grounds, disrupting their life cycles and making reproduction difficult.

7.4 Aquifers

Carrizo–Wilcox Aquifer

According to information from the Texas Water Development Board and as shown in the Aquifer Figure in Appendix A, the Carrizo-Wilcox Aquifer outcrops and recharges along the API from river mile 420 to 405 (TWDB, 2024c). The aquifer subcrops from river mile 405 to 344, just north of Laredo. The Carrizo-Wilcox Aquifer supplied 55% of the 14.7 million acre-feet of water used by Texas in 2020. About 75% of that water was used for irrigation. Water levels have declined in the Winter Garden area because of irrigation pumping and in the northeastern part of the aquifer because of municipal pumping. Impacts to groundwater would need to be coordinated with the Wintergarden Groundwater Conservation District and TCEQ.

Sole Source Aquifers

According to the EPA's Sole Source Aquifers map, the API is not within a sole source aquifer area.

7.4.1 Assumption 1 – Depth Control via Water Releases

Raising the water level within the API would result in more water coverage of the recharge zone of the Carrizo-Wilcox Aquifer. This could allow for more potential recharging of the aquifer. However, with commerce as the project's intended use, the potential of contaminants to be introduced to the aquifer is increased too. A more in-depth analysis of recharge rates would be needed to accurately assess this threat to the water source.

7.4.2 Assumption 2 - Dredging

Dredging would increase the dewatering of the floodplain along the API. The reduced time that that floodwaters spend in the floodplain could reduce the recharge potential of the Carrizo-Wilcox Aquifer within the API. A more in-depth analysis would be needed to determine the significance of the loss of recharge. Also, with commerce as the project's intended use, the potential of contaminants to be introduced to the aquifer is increased.

7.4.3 Assumption 3 – Locks & Dam System

Under a lock and dam system, the impounded water that overlays the recharge area of the Carrizo-Wilcox Aquifer could increase the rate of recharge into the aquifer. However, with commerce as the project's intended use, the potential of contaminants to be introduced to the aquifer is increased too. A more in-depth analysis of recharge rates would be needed to accurately assess this threat to the water source.

7.5 Wetlands

The U.S. Fish and Wildlife Service's National Wetland Inventory (NWI) was used to assess the resources present within the API. Within this API there are several types of waters including freshwater emergent wetland, freshwater forested/shrub wetland, freshwater pond, lake, and riverine. The table below lists the types and amounts of wetlands in the API on the U.S side of the river.

Wetland Type	Wetland Description	Acres of Wetland within U.S. portion of API
Freshwater Emergent Wetlands	Emergent wetlands are a transitional area between permanently wet and dry environments as a place where the land emerges from the water to join the surrounding vegetation. These wetlands have plants that have specifically adapted called hydrophytes. These plants flourish with their roots planted in the nutrient rich oxygen depleted soil and their stems above the changing water temperatures.	70 acres
Freshwater forested/shrub wetland	Forested Shrub wetlands usually occupy the first terraces of river floodplains, low areas and the areas along the river or creek channels. These wetlands are also categorized by the many types of hardwoods and shrubs.	1,823 acres
Freshwater pond	Freshwater pond wetlands are categorized by the freshwater that collects on the land near the river, floodplain, marshes, seeps and springs.	321 acres
Lake	Lake is used to describe wetlands and deepwater habitats situated in a topographic depression or a dammed river channel, lacking trees, shrubs, persistent emergents, and emergent mosses or lichens with 30 percent or greater areal coverage, and total area of at least 20 acres.	600 acres
Riverine	A riverine wetland is categorized as bottomland hardwood. These are ecosystems that experience periodic overbank flooding from the adjacent river or major streams.	4,377 acres

In addition to the wetland resources identified in the United States Fish and Wildlife Service (USFWS) National Waters Database (NWI), (USFWS, 2024) database, the API also overlaps the service areas for the Rio Grande Mitigation Site, a private commercial mitigation bank. This bank, USACE permit number SWF-1997-00495, offers riverine freshwater wetland credits for PEM, PSS, and PFO wetlands (Ironwood Resource Advisors, 2024).

The USACE Permit Finder was reviewed for permit applications, issued permits, approved jurisdictional determinations, Section 408, and the Water Resources Development Act (WRDA) projects within the API. None were shown in the permit finder. The nearest result in the permit finder on the Rio Grande is the IBWC's Letter of Permission for the IBWC/Letter of Permission (LOP)/Falcon Reservoir/Zapata Co. Project, SWG-2022-00577 that is shown on the northeast bank

of the reservoir outside of the API (USACE, 2024).

Under all assumptions below, wetland and water resources would need to be field delineated by wetland scientists. The NWI data is a desktop source of information only and is not intended to be, nor is it accurate enough to be, used for permitting or mitigation calculation. Once the amount of wetland resources in the API is correctly identified and calculated the total impact from a project could be determined along with appropriate permitting and mitigation. If an agency other than USACE is the project sponsor, the impacts would require a Section 10/404 permit. If by USACE, then the project would need to be identified in WRDA legislative package and then funding would need to be allocated. The Section 10/404 permit process would require

- Section 401 water quality certification from TCEQ,
- Section 7 consultation with USFWS from impacts to protected species and their habitat,
- Section 107 coordination with THC for impacts to historic/cultural resources,
- USACE Real Estate for any USACE easements,
- Section 408 coordination for navigational servitude areas that may be present.

Under WRDA legislation the same resources would be evaluated but through the documentation of public interest review factors in a USACE Feasibility EA or EIS. Once the impacts to wetlands and water resources are known they would also require offset with a mitigation plan. There are currently limited mitigation credits available from the one bank in the API. If insufficient credits are available from a bank, a permittee responsible mitigation plan would be required to identify the location, size of, and future management in perpetuity of wetland mitigation sites.

7.5.1 Assumption 1 – Depth Control via Water Releases

If the API was to be made more navigable by raising the water level through releases from lake Amistad some of the wetlands adjacent to the river would be inundated and that natural resource would be impacted. Wetlands provide important habitat for many types of flora and fauna in the API and adjacent areas and the impact from the loss of wetlands would have a cumulative affect across many natural resources.

7.5.2 Assumption 2 - Dredging

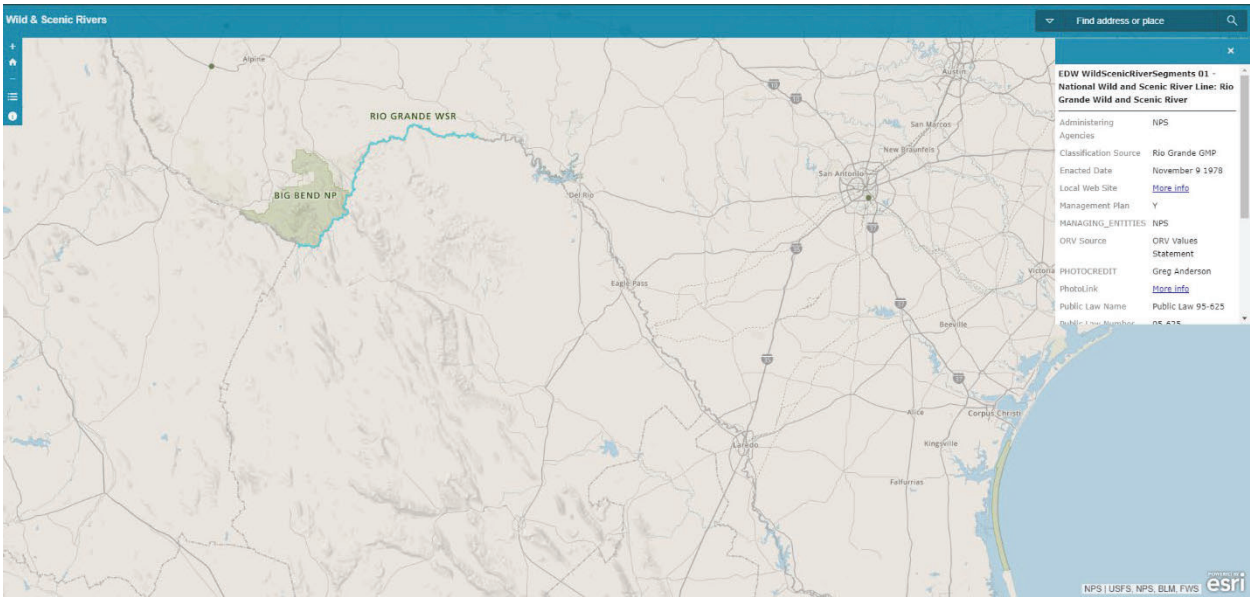
If portions of the API were dredged to make it more navigable the hydrology of the adjacent wetlands could be impacted from changing the water levels in stream. In addition, dredge material placement areas would need to be created near the API to receive the dredge from the river. Each DMPA created could directly impact wetlands within its footprint and indirectly impact wetlands through dewatering from the dredge material and by changing surface hydrology in the immediate area of the DMPA.

7.5.3 Assumption 3 – Locks & Dam System

Impacts to waters in the API from the lock and dam system could occur from the water level rising similar to Assumption 1 and from the footprint of the locks along with the access routes and utilities that would need to be provided to each lock.

7.6 Wild and Scenic Rivers

The API does not include a designated wild and scenic river segment but is located approximately 60 miles downstream from the southernmost designated wild and scenic river segment of the Rio Grande, which was designated on November 10, 1978, and consists of approximately 191 miles of river on the United States side starting from RM 842.3 and extending to RM 651.1 highlighted in the figure below (National Wild and Scenic Rivers System, 2024). Impacts to wild and scenic rivers would be subject to Section 7 of the Wild & Scenic Rivers Act.



7.6.1 Assumption 1 – Depth Control via Water Releases

If water is to be released upstream of the API between RMs 842.3 and 651.1 to increase water levels for navigation purposes, there would be an effect on the designated wild and scenic river on the Rio Grande through loss of water volume that could affect the vegetation and wildlife that depend on the water in that segment.

7.6.2 Assumption 2 – Dredging

Dredging of the Rio Grande and releasing water from reservoirs would have an effect on the designated wild and scenic river on the Rio Grande through loss of water volume that could affect the vegetation and wildlife that depend on the water in that segment.

7.6.3 Assumption 3 – Locks & Dam System

Similar to Assumption 1 and 2, a lock and dam system would have an effect on the designated wild and scenic river on the Rio Grande through loss of water volume that could affect the vegetation and wildlife that depend on the water in that segment.

7.7 Floodplain Management

Flood Zones

The Federal Emergency Management Agency (FEMA) defines Special Flood Hazard Areas

(SFHAs) as areas that will be inundated by the 100-year flood or the 1-percent annual chance flood and label these areas on Flood Insurance Rate Maps as Zone A and Zone V (including Zones A and V followed by a number or letters). Other designated flood zones include moderate flood hazard areas (Zone B or Zone X [shaded]) that occur in areas between the limits of base flood and the 500-year flood or the 0.2 percent annual change flood and minimal flood hazard areas (Zone C or Zone X [unshaded]) that occur outside the SFHA and higher than the 500-year flood (FEMA, 2024).

The API encompasses approximately 52,738 acres of designated flood hazard areas including about 50,972 acres within Zone A, 1,549 acres within Zone AE, and 218 acres within Zone X (shaded). These flood zones generally occur along the length of the Rio Grande within the API. Approximately 44 percent of the API occurs within the 100-year flood zone (Zones A and AE). The API and the FEMA 100-year floodplains within the API can be seen in the floodplain figure in Appendix A.

Executive Order 11988

Executive Order 11988 is a directive that requires federal agencies to avoid the long and short-term adverse impacts associated with the occupancy and modification of floodplains. The order also requires federal agencies to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. The order applies to federal agencies' responsibilities for acquiring, managing, and disposing of Federal lands and facilities, providing Federally undertaken, financed, or assisted construction and improvements, and conducting Federal activities and programs affecting land use.

7.7.1 Assumption 1 – Depth Control via Water Releases

Assuming a river depth of 12 feet to allow commercial barge traffic to use the river, NOAA river gauges at Laredo and Eagle Pass put the 12-foot water level as minor flooding. The river gauge at Del Rio puts a 12-foot water level as a major flood. The National Oceanic and Atmospheric Administration (NOAA) defines ***Minor Flood*** level as a general term indicating minimal or no property damage but possibly some public inconvenience. ***Major Flooding*** is defined as a general term including extensive inundation and property damage. (Usually characterized by the evacuation of people and livestock and the closure of both primary and secondary roads.)

Levee System/Infrastructure

Under this assumption, a sustained major flood level in the Del Rio area would require a levee system to protect the city from the new, higher river level. A more in-depth examination would be required to determine the extent of the levee system that would be needed.

At Eagle Pass and Laredo, the minor flooding that would be caused by raising the river level may not need levees or relocation of buildings; however, the 100-year floodplain could be increased with the river sustaining an elevated level. A levee system could be used to mitigate the increased 100-year floodplain.

Del Rio, Laredo, and Eagle Pass are the three largest communities in the API. A more in-depth

examination of the API would be needed to identify all areas that would need to have infrastructure improvements before increasing the flow of the Rio Grande to accommodate commercial traffic. Any bridges' crossing over the Rio Grande would need to be raised to accommodate the higher water level and flow, and to give ample clearance for the intended commercial vessels to navigate the river. Bridges would also need to be inspected to determine if they could withstand the increased and sustained flow velocity and depth. Dams in place for water diversion for residents (not including Amistad or Falcon dams) would need to be removed and the delivery methods for water collection reevaluated to accommodate the commercial traffic and increased flows.

Home Relocation

Relocation of properties within the waterline at and below the 12 feet would be required. Properties that reside within the increased 100-year floodplain would be preferred to reduce the loss of life and property during any future flooding. Evaluation and selection of land for construction of new homes would need to be done.

Elevation/Reconstruction

Residents that reside within the higher resulting 100-year floodplain elevation that choose not to relocate would need to have their property raised to at least 2 ft above the increased 100-year floodplain level to avoid damage during any future floods.

Acquisition and Demolition

Properties that would fall within the areas to be flooded by increased river flow would be acquired. After acquisition, all structures would be demolished and removed. Reclamation of sites would follow.

7.7.2 Assumption 2 – Dredging

Dredging of the river channel to a depth of 12 feet and width of 125 feet to allow commercial barge traffic to use the river would impact the 100-year floodplain elevation and allow flood waters to recede faster and less area to be covered when a flood does happen. In addition, the speed of floodwater would increase with dredging. Dredge placement areas placed in or near the floodplain would also need to be reviewed for potential effects to the 100-year floodplain.

Levee System/Infrastructure

Any bridges crossing over the Rio Grande would need to be modified to accommodate the span of the dredged channel and to give ample clearance for the intended commercial vessels to navigate the river. Bridges would also need to be inspected to determine if they could withstand the increased sustained flow velocity.

Elevation/Reconstruction

Dredging increases the hydraulic capacity of the river channel which would impact the 100-year floodplain elevation. Additional stormwater modeling based on the revised river shape would need to be conducted to assess those impacts.

Home Relocation
Dredging increases the hydraulic capacity of the river channel which would impact the 100-year floodplain elevation. Additional stormwater modeling based on the revised river shape would need to be conducted to assess impacts to homes in and near the API within the current and revised 100-year floodplain.

Acquisition and Demolition
Dams that are in place for water diversion (not including Amistad or Falcon dams) for use by residents would need to be removed and the delivery methods for water collection be reevaluated to accommodate the commercial traffic and dredging channel.

7.7.3 Assumption 3 – Locks & Dam System
A lock and dam system would raise and sustain the water level along the API. The extent of structures that would be covered by the different full pool levels would need to be evaluated for each individual pool.

Levee System/Infrastructure
With the increased and sustained water levels of the pools any bridges' crossing over the Rio Grande would need to be rebuilt or rerouted to accommodate the higher water level, wider body of water, and to give ample clearance for the intended commercial vessels to navigate the new lock and dam pools. Dams in place for water diversion for residents (not including Amistad or Falcon dams) would need to be removed and the delivery methods for water collection reevaluated to accommodate the lock and dam system.

Home Relocation
Relocation of properties within the different pools full pool water levels would be required. Relocation of properties that reside within the higher resulting 100-year floodplain would be preferred to reduce the loss of life and property during any future flooding. Evaluation and selection of land for construction of new homes would need to be done.

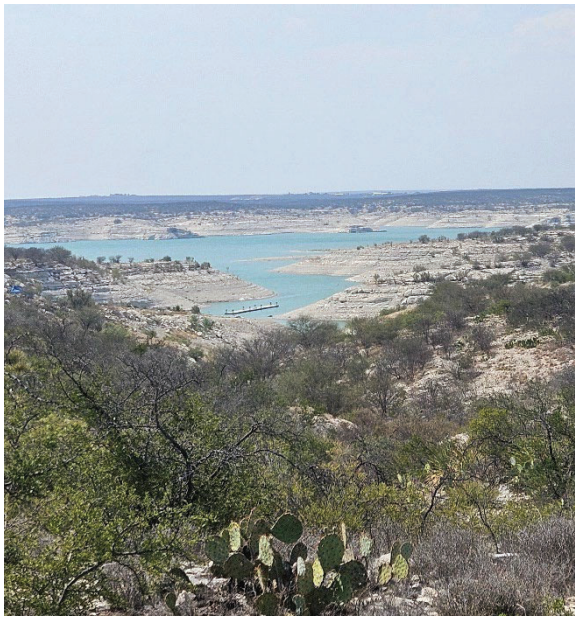
Elevation/Reconstruction/Relocation
Residents that reside within the higher resulting 100-year floodplain elevation that choose not to relocate would need to have their property raised to at least 2 ft above the 100-year floodplain level to avoid damage during any future floods.

Acquisition and Demolition
Properties that would fall within the areas to be flooded by the new lock and dam pools would be acquired. After acquisition, all structures would be demolished and removed. Reclamation of sites would follow.

7.8 Farmland
The Farmland Protection Policy Act (FPPA), established in 1981, aims to minimize the conversion

of valuable farmland to non-agricultural uses by federal programs. It discourages federal actions that unnecessarily and permanently turn farmland into development or other non-farming uses. The FPPA also emphasizes that federal programs should be compatible with efforts at the state, local, and private level to protect farmland. Federal agencies are required to regularly review and update their policies to ensure they comply with the FPPA. While the FPPA doesn't regulate private land use or restrict property rights of landowners, it serves as a reminder to federal agencies to consider the impact their programs have on the preservation of farmland. During the June 4 and 5, 2024 site visit, agricultural land was noted within the API, including pecan farms and cattle ranches. A portion of the soils on the project site are listed as farmlands of statewide importance or prime farmland, the project is on land that will be used for water storage and not exempt. A list of soils and their prime farmland rating is included in Appendix B. An NRCS Consultation for the proposed API under the National Environmental Policy Act, as required by the Farmland Protection Policy Act, would be required to review impacts in the API.

The Harlingen Irrigation District (HIDCC1) serves 56,114 acres of farmland in the Rio Grande Valley, sourcing water from the Falcon Reservoir. The Rio Grande is the only source of water for the district. Farmers along the Rio Grande below Amistad Dam are currently facing drought conditions. Amistad Reservoir storage is currently at 26.1% of capacity and Falcon Reservoir is at 9.8% as of June 10, 2024. A picture taken from the southeast shore of Amistad Reservoir is shown on the left.



Actions involving increasing water flows to support navigability would necessarily reduce water available for irrigation withdrawal (Water Data for Texas, 2024).

7.8.1 Assumption 1 – Depth Control via Water Releases

Within the existing channel, terrace, and floodplain contour of the Rio Grande River, water releases would result in navigable depth by inundating a large area of surrounding land, including many low-lying croplands and livestock grazing areas. This would also create directional flows in these areas that would increase erosion. This erosion would cause soil loss at the origin and increase sediment in downstream areas.

7.8.2 Assumption 2 - Dredging

Dredging the river to maintain navigable depths would also require increasing river flows within the API. Providing water to maintain this flow would require reducing withdrawals for irrigation, which would be disastrous for farmers depending on this water, especially during exceptional drought.

7.8.3 Assumption 3 – Locks & Dam System

Widening the river to provide the necessary channel bottom depth and providing for the associated structures would require removal of soil adjacent to the channel, which in some cases would result in loss of farmland acres. The disposal of this dredged material would also likely consume farmland acres, as would staging and operational areas for construction activities.

Additionally, the channel dimensions required to operate this system would require an increased volume of water to fill the locks. The filling of this new channel would require prioritizing this process over providing water to Falcon Reservoir and the Harlingen Irrigation District. Failure to deliver irrigation water to the farmers within the Irrigation District would cause production losses, particularly during a pre-existing drought emergency.

7.9 Threatened and Endangered Species

A certified wildlife biologist performed a preliminary site visit to access the presence of listed species and suitable habitats at several locations in and near the API including the eastern shoreline of Amistad and Falcon Reservoirs, eastern bank upstream of Del Rio from Vega Verde Road, Shelby Park in Eagle Pass, John Peter and Conseulo Montalvos Los Tres Park in Laredo, and by airboat from Shelby Park to the buoys. The API is located in Zapata, Webb, Maverick, Kinney and Val Verde Counties. Based on the Official Species List published by the U.S. Fish and Wildlife Service on the Information for Planning and Consultation (IPaC) system (Appendix C), there is a total of 22 threatened, endangered, or candidate species on this species list. A more detailed site survey for species on this list and their potential habitat should be conducted. The species listed in these five counties are shown in the table below and a detailed description of these species is provided in Appendix C.

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). The MBTA implements conventions (bilateral treaties) between the United States and four neighboring countries, one of which is Mexico, for the protection of migratory birds. Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate conservation measures. The IPaC, included in Appendix C, states there are likely bald eagles present in the API, therefore a nest survey would need to be conducted prior to construction activities.

Certain birds are protected under the MBTA, the BGEPA, and the Mexico-United States: Convention for the Protection of Migratory Birds and Game Mammals (See Appendix C for complete list of birds listed for each). Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures.

There are critical habitats in the API for several species as indicated in the table below. Several of these species' critical habitats are shown in the TXNDD and Critical Habitat Figure in Appendix A; however not all critical habitats are available in shapefile. Additional information on all of the species and their critical habitat is included in Appendix C.

Further surveying of the API for existing or potential habitat and a presence/absence survey for these species should be conducted to determine if the project (under any assumption) would affect these federally listed endangered or proposed endangered species.

Species	USFWS Designation*	Critical Habitat in API? Y/N	Affected by Assumption? Y/N/PE		
			Assumption 1	Assumption 2	Assumption 3
Amphibians					
San Marcos Salamander (*Eurycea nana*)	T	N	N	N	N
Birds					
Golden-cheeked Warbler (*Setophaga chrysoparia*)	E	N	PE	PE	PE
Piping Plover (*Charadrius melodus*)	T	Y	PE	PE	PE
Rufa Red Knot (*Calidris canutus rufa*)	T	Proposed	PE	PE	PE
Cactus Ferruginous Pygmy-owl (*Glaucidium brasilianum cactorum*)	T	Y	PE	PE	PE
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	E	Y	PE	PE	PE
Flowering Plants					
Ashy Dogweed (*Thymophylla tephroleuca*)	E	N	PE	PE	PE
Star Cactus (*Astrophytum asterias*)	E	N	PE	PE	PE
Tobusch Fishhook (*Sclerocactus brevihamatus ssp. tobuschii*)	T	N	PE	PE	PE
Walker's Manioc (*Manihot walkerae*)	E	N	PE	PE	PE
Zapata Bladderpod (*Physaria thamnophila*)	E	Y	PE	PE	PE
Prostrate Milkweed (*Asclepias prostrata*)	E	Y	PE	PE	PE
Insects					
Monarch Butterfly (*Danaus plexippus*)	C	N	PE	PE	PE
Mammals					

Species	USFWS Designation*	Critical Habitat in API? Y/N	Affected by Assumption? Y/N/PE		
			Assumption 1	Assumption 2	Assumption 3
Gulf Coast Jaguarundi Puma (*Puma yagouaroundi cacomitli*)	E	N	PE	PE	PE
Tricolored Bat (*Perimyotis subflavus*)	PE	N	PE	PE	PE
Fishes					
Devils River Minnow (*Dionda diaboli*)	T	Y	Y	Y	Y
Fountain Darter (*Etheostoma fonticola*)	E	Y	Y	Y	Y
Mexican Blindcat (*Prietella phreatophila*)	E	N	Y	Y	Y
Rio Grande Silvery Minnow (*Hybognathus amarus*)	EPN	N	Y	Y	Y
Clams					
Mexican Fawnsfoot (*Truncilla cognata*)	PE	Proposed	Y	Y	Y
Salina Mucket (*Potamilus metnecktayi*)	PE	Proposed	Y	Y	Y
Texas Hornshell (*Popenaias popeii*)	E	Proposed	Y	Y	Y
*Threatened or endangered species as designated by the United States Fish and Wildlife Service based on IPAC (Appendix C). T=Threatened; E= Endangered; PE= Proposed endangered; EPN= Experimental Population, Non- Essential Y= Yes N= No PE=Potential Effect					

Amphibians

The only federally listed amphibian species by the IPaC is the San Marcos Salamander. There is, however, no critical habitat within the API for this species. This species is also endemic to the San Marcos River, henceforth, no impacts from the three scenarios/assumptions (assumptions 1, 2 and 3 discussed below: sections 6.2 and 6.3) are expected.

Mammals

The impacts to the two federally listed mammals are described below and the potential effects that can presently be described without further analyses are similar for all three assumptions.

Jaguarundi: The release of water from the Amistad, the dredging of the river, or the implementation of a locks and dam system in the Rio Grande River may impact jaguarundi populations, primarily through habitat alteration, disturbance, and potential changes in prey availability. Alterations to riparian vegetation and habitat structure could reduce suitable habitats for jaguarundis and increase their vulnerability to threats. The noise and human activity associated with dredging operations or installation of locks and dams may disturb jaguarundis, potentially leading to displacement or disruption of their activities. Additionally, changes in prey abundance and behavior due to any of the aforementioned activities could affect jaguarundi hunting strategies and increase competition for food resources. To mitigate these impacts, efforts should focus on minimizing habitat disturbance, maintaining connectivity between habitats, and monitoring prey populations to support the conservation of jaguarundis in the region.

Tricolored bat: Changes to habitat structure from assumptions 1-3 may affect the suitability of roosting sites and disrupt the tri-colored bats' daily routines. Additionally, alterations in water flow and habitat conditions could disrupt the availability of insects, the bats' primary food source, potentially impacting foraging opportunities. Indirectly, changes in insect populations due to dredging may further affect the bats' feeding behavior. To mitigate these risks, efforts should focus on minimizing habitat disturbance, preserving roosting sites, and monitoring insect populations to support the conservation of tri-colored bats in the region.

Plants

Similar to mammals and amphibians, the effects that plants may have from the three scenarios are unique to particular habitats and species. Species and habitat distribution analyses are required to assess the impacts of these three assumptions.

Insects

The monarch butterfly relies on the prostrate milkweed (endangered) in and around the API. Construction activities, noise, a change to vegetation are some examples of impacts that might impact the monarch butterfly under any of the three scenarios.

7.9.1 Assumption 1 – Depth Control via Water Releases

Birds

The release of dammed water to raise river levels can significantly impact bird species, particularly those that rely on riverine and riparian habitats. Inundation of nesting sites is a major concern, as birds that depend on riparian vegetation may have their nests destroyed and suitable nesting areas reduced. Additionally, increased water levels can erode riparian zones, resulting in habitat loss for many bird species. The timing of water releases is crucial, as releases during breeding seasons can flood nests and drown chicks, disrupting breeding cycles for species that nest on riverbanks and sandbars. Furthermore, many birds rely on specific water levels to access feeding grounds; wading birds, for instance, need shallow waters to hunt for their food, and increased water levels can submerge these feeding areas, making it difficult for them to find sustenance.

Changes in water flow and quality can also affect the availability of food sources essential for many bird species. Birds that feed on fish and other aquatic organisms may struggle to locate prey if these populations are disrupted by altered flow regimes. Riparian habitats support a diverse community of terrestrial insects and plants, and flooding and habitat alteration can reduce the abundance of these food sources, impacting insectivorous birds. Altered water levels can change habitat structure, making birds more vulnerable to predators; for example, reduced vegetation cover can expose nests to predators, especially for ground-nesting birds. Additionally, water releases can facilitate the spread of invasive species that compete with native birds for resources, with invasive plant species altering habitat structure and food availability and invasive predators preying directly on bird eggs and chicks. Effective water management strategies must balance the ecological needs of birds with human requirements, including timing water releases to avoid critical breeding periods, maintaining riparian vegetation, and monitoring bird populations on an individual basis to assess the impacts of water management practices.

Fishes

While releasing water upstream can create new habitats and improve water quality by diluting pollutants, poorly managed releases can disrupt fish behavior and habitat patterns. Careful management is essential to mitigate risks such as habitat displacement and stress due to changes in water flow and temperature among other factors.

Clams

The Texas hornshell relies on stable river conditions for its survival, including suitable water flow and quality. While raising the water level may initially provide benefits by increasing habitat availability and connectivity, it can also bring about several challenges. Fluctuations in water flow resulting from dam operations can disrupt the natural breeding and feeding behaviors of the Texas hornshell. Additionally, changes in water quality, such as increased sedimentation or pollution, associated with altered flow regimes can negatively impact mussel populations. The Mexican fawnsfoot and the Salina bucket would be similarly affected by these actions.

7.9.2 Assumption 2 – Dredging.

Birds

Dredging can have significant impacts on sensitive bird populations and their habitats, thus necessitating a comprehensive study of the individual habitats along the API to quantify the individual effects on species. Some main areas of concern/to be studied are outlined below:

1. Habitat Loss: Dredging involves the removal of sediments from riverbeds, which can destroy or disturb important nesting, feeding, and roosting habitats for birds that rely on river ecosystems. This disruption can directly displace bird populations and reduce the availability of suitable habitat. Additionally, the loss of riparian habitat, the submerging of islands due to raised water levels, the loss of vegetative cover, etc. can all play a role contributing to the loss of habitat.
2. Disturbance and Noise: Dredging activities generate considerable noise and disturbance, which can disrupt bird behavior, including breeding, feeding, and communication. Birds may abandon nesting sites or feeding areas in response to the disturbance, leading to population declines or shifts in distribution.
3. Water Quality: Dredging can alter water quality parameters such as turbidity, sediment concentration, and oxygen levels, which can impact the availability of prey species for birds that feed on fish, invertebrates, or aquatic plants. Changes in water quality may also affect the health of bird populations indirectly through contamination or reduced food availability.
4. Migration Patterns: Dredging activities may disrupt bird migration patterns, particularly if the dredging occurs in critical stopover sites or along migratory routes. Birds may be forced to alter their flight paths or find alternative stopover sites, which can increase energy expenditure and mortality risks, particularly for long-distance migrants.
5. Collateral Damage: In addition to direct impacts on bird populations, dredging operations can cause collateral damage to birds through incidental capture or disturbance from construction equipment, such as boats, barges, and machinery. Birds may collide with dredging vessels or become entangled in nets or other equipment, leading to injuries or mortality.

Overall, the dredging of rivers can have complex and far-reaching impacts on bird populations and their associated ecosystems, highlighting the importance of carefully assessing and mitigating potential risks to avian biodiversity during such activities.

Fishes

Dredging of the river can significantly impact threatened or endangered fish species. This process destroys critical habitats, such as gravel beds essential for spawning and juvenile development, and alters the river's morphology, eliminating structures that provide refuge and feeding areas. Increased sedimentation from dredging activities can smother fish eggs and larvae, reducing hatching success and increasing juvenile mortality. Sediment can also clog the spaces between gravel and rocks, degrading habitat quality and reducing food resources. Additionally, dredging disturbs fish during critical breeding and feeding periods, leading to lower reproductive success and growth rates. It also impacts the availability and diversity of benthic invertebrates, altering the

food web and prey availability. Increased turbidity from dredging reduces light penetration, affecting the growth of aquatic plants and algae, which are crucial to the aquatic ecosystem. These changes collectively threaten the survival and recovery of endangered fish in the Rio Grande River. Individual assessments for individual habitats and species must be conducted to quantify these impacts.

Clams

Dredging in the Rio Grande River would likely have detrimental effects on endangered (Texas hornshell) or proposed endangered clam populations, including habitat destruction, disruption of reproductive cycles, and increased sedimentation. The loss of suitable habitat due to dredging activities can directly impact clam populations by reducing available areas for colonization and survival. Changes in the riverbed structure caused by dredging may render previously suitable habitats unsuitable for clam survival, further reducing their population size and distribution. Moreover, dredging can disrupt the reproductive cycles of endangered clams by disturbing spawning grounds and sediment layers where eggs and larvae develop, leading to reduced reproductive success and recruitment. The physical disturbance caused by dredging may also harm adult clam populations, including broodstock individuals responsible for producing offspring, further exacerbating population decline. Additionally, increased sedimentation resulting from dredging activities can smother clam habitats, burying individuals alive and inhibiting their feeding and respiration processes. Additionally, the release of suspended sediments during dredging can degrade water quality, increasing turbidity and sedimentation rates, which can stress clam populations and make them more susceptible to disease and predation. In conclusion, addressing habitat disturbance, protecting spawning grounds, and regulating sedimentation levels are crucial for mitigating the negative impacts of dredging on endangered clam populations in the Rio Grande River. Further research into the specific distribution of individual species is also recommended.

7.9.3 Assumption 3 – Locks & Dam System

Birds

A lock and dam system in the river can significantly impact bird species in various ways, affecting their habitats, feeding, breeding, and overall population dynamics. The primary impacts include habitat alteration, disruption of natural water flow, changes in food availability, and increased predation and competition. Again, this necessitates individual habitat and species studies to assess these impacts. Similar impacts to bird species that are possibilities are more thoroughly described in Assumption 1 and 2 of this section.

Fishes

Fish may find it difficult to pass through or around these barriers, leading to population fragmentation and reduced genetic diversity. Additionally, the altered flow regime can influence spawning sites and food availability, further stressing fish communities and potentially leading to declines in native species.

Clams

The locks and dams would require dredging, the action of which would remove specimen and also habitat. There would be a change in water flow, which is necessary for clam reproduction, movement, and feeding. Dispersal of dietary resources would be impacted, even in areas that were not directly dredged, due largely in part to sedimentation occurring during events increasing turbidity (construction, subsequent opening and closing of the lock/dam systems).

7.10 Vegetation and Wildlife

This section describes the vegetation and wildlife resources expected to occur within the API. Species addressed in this section include those not listed as threatened or endangered by the Federal government. Federal threatened and endangered species and other sensitive wildlife species are addressed in Section 4.9.

The vast expanse of South Texas plains and brush country extends from the fringes of the Hill Country all the way down into the lush subtropical regions of the Lower Rio Grande Valley. This diverse landscape encompasses arid stretches dominated by swaying grasses and punctuated by the rugged presence of thorny brush like mesquite and prickly pear cacti. The terrain here is characterized by its rugged beauty, where the resilience of nature thrives amidst the harshness of the environment. It's a place where wide-open spaces beckon adventurers to explore, and where the echoes of history can be felt in every gust of wind. In this land of extremes, where the sun beats down relentlessly and the earth seems to stretch out endlessly, one can find solace in the quiet majesty of the untamed wilderness (TPWD, 2024a).

Mesquite (*Prosopis glandulosa)* is a thorny, deciduous tree or shrub with single or branching stems, commonly found in Texas and across the southern United States and Mexico. Its fruits are clustered pods that can grow up to 8 or 10 inches long and may be particularly plentiful during drought years. Mesquite thrives in dry ranges, washes, and low elevations in the Trans-Pecos region of Texas (Texas A&M Argilife Extension).

Prairie acacia (*Acacia angustissima)* is a native perennial legume (Correll and Johnston 1996; Diggs et al. 1999) that can range from an herbaceous plant with delicate fern-like foliage to a semi-woody sub-shrub reaching 3-4 feet tall. Its leaves are alternate and bipinnate, with small leaflets. The plant produces white to cream flowers in 1-2 cm wide heads, forming terminal clusters on long stalks arising from upper leaf axils. Its fruit is a brownish flat seedpod measuring 4-7 cm long and 6-8 mm wide. Prairie acacia's distribution spans from Kansas and Missouri south into the eastern two-thirds of Texas. (Lloyd-Reilley, 2007)

The Texas prickly pear *(Opuntia engelmannii)*, is a prominent cactus species found throughout the South Texas Plains and other regions of Texas. This iconic plant is characterized by its distinctive flattened pads covered in sharp spines and its vibrant yellow flowers that bloom in the spring. The prickly pear serves as an essential part of the local ecosystem, providing food and habitat for various wildlife species, including birds and small mammals. Additionally, it has historical and cultural significance, with its fruits being used in traditional cuisine and its pads utilized for medicinal purposes by indigenous peoples and settlers alike.

Riparian areas in the region are typically characterized by a mix of woody and herbaceous species that grow along riverbanks. Common plant species found in these areas include common reed, giant ragweed, American germander, baccharis, green ash, maidencane, many-spiked flat sedge, purple marsh fleabane, Rio Grande dewberry, Rio Grande palmetto, sea oxeye daisy, sprawling lippie, and hackberry. However, two invasive species, salt cedar and carrizo cane, have become dominant in many riparian areas, posing a challenge to native vegetation (GSRC, 2016).

Grassy uplands are primarily characterized by buffelgrass, Kleberg bluestem, and guinea grass. Other plant species present in this vegetation community include Carolina wolfberry, deer pea, depression weed, hachinal, hairypod cowpea, honey mesquite, huisache, retama, scorpion weed, shrubby blue sage, Torrey's croton, velvet leaf Indian mallow, shrub morning glory, and chandelier plant. In regions affected by disturbance or within urban communities, Bermudagrass tends to dominate the vegetation (GSRC, 2015, 2016).

The South Texas Plains have great species diversity due to a climate mixing subtropical, temperate, and coastal. This region is home to a magnitude of animals some common animals that may be encountered in this region include Caracara *(Caracara cheriway)*, Roadrunner (*Geococcyx californianus)*, Ferruginous Pygmy-Owl (*Glaucidium brasilianum)*, Green Jay (*Cyanocorax yncas)*, Elf Owl (*Micrathene whitneyi)*, Texas Tortoise (*Gopherus berlandieri)*, Indigo Snake *(Drymarchon melanurus)*, Texas Longnose Snake (*Rhinocheilus lecontei)*, Mexican Burrowing Toad *(Rhinophrynus dorsalis)*, Grooved-billed Anis (*Crotophaga sulcirostris)*, Redwing Blackbird (*Agelaius phoeniceus)*, Swallowtail Butterfly (*Papilio spp* and the Leopard Frog (*Lithobates sphenocephalus)* (Texas Parks and Wildlife Department. "South Texas Plains).

Wildlife that was noted during the June 4 and 5, 2024 site visit includes the crested caracara (*Caracara cheriway*), northern cardinal (*Cardinalis cardinalis*), northern bobwhite (*Colinus virginianus*), Mexican duck (*Anas diazi*), great-tailed grackle (*Quiscalus mexicanus)*, mourning dove (*Zenaida macroura*), rock pigeons (*Columba livia*), anhinga (*Anhinga anhinga*), black-bellied whistling ducks (*Dendroctgna autumnalis)* (shown in the photo on the right in an area north of Del Rio*)*, red winged black bird (*Agelaius phoeniceus*), northern rough-winged swallow (*Stelgidopteryx serripennis*), Rio Grande cooter (*Pseudemys gorzugi*), sulphurs (*Phoebis sp.*), foot prints of opossum (*Didelphis virginiana*), footprints of hogs (*Sus scrofa*), and footprint of deer (*Odocoileus virginianus*).

Vegetation that was noted during the June 4 and 5, 2024 site visit includes the Giant Cane (*Arundo donax*), black willow (*Salix nigra*), huisache (*Acacia farnesiana*), honey mesquite (Prosopis glandulosa), retama (Parkinsonia aculeata), rattlebush (*Sesbania drummondii*), netted globe berry (M*argaranthus solanaceus)*, silverleaf nightshade (*Solanum elaeagnifolium*), common sunflower (*Helianthus annuus*), common reed (*Phragmites australis*), guineagrass (*Urochloa maxima*), buffelgrass (*Pennisetum ciliare*), Bermudagrass (*Cynodon dactylon*), watermilfoil (*Myriophyllum sp*.), water oak (*Quercus nigra*), Slender Vervain (*Verbena officinalis*), false willow (*Baccharis neglecta*), and smartweed (*Polygonum spp.*).

7.10.1 Assumption 1 – Depth Control via Water Releases

Raising the water level would have complex effects on vegetation. While it could provide benefits such as increased water availability and habitat restoration for some plant species, it also poses risks such as erosion, inundation, changes in species composition, and the spread of invasive species. The outcome would depend on factors like the duration and extent of flooding, as well as the adaptability of plant species to changing hydrological conditions. Careful management and monitoring are essential to mitigate potential negative impacts and promote the overall health of riparian ecosystems.

Lowering the water level in the Rio Grande could detrimentally affect riparian vegetation. Reduced water availability would stress or kill plants reliant on consistent water sources, potentially leading to habitat loss and decreased biodiversity. Increased competition among plant species for limited water resources could further disrupt ecosystem balance. Exposed to drought and lacking wetland habitats, vegetation would face heightened vulnerability. These negative impacts highlight the importance of managing water levels to sustain the health and diversity of plant communities along the Rio Grande.

7.10.2 Assumption 2 - Dredging

Dredging would significantly impact plant life along its banks and within the riverbed. The process disturbs sediment, leading to increased turbidity and reduced light penetration, which can inhibit photosynthesis for aquatic plants. Habitat destruction from dredging alters the landscape, removing crucial habitats for riparian vegetation and disrupting the natural balance of plant communities. Furthermore, the erosion caused by dredging can further destabilize riverbanks, leading to the loss of vegetation and exacerbating habitat loss. Overall, dredging would have detrimental effects on plant life, disrupting ecosystems and potentially leading to long-term declines in biodiversity along the Rio Grande.

7.10.3 Assumption 3 – Locks & Dam System

Raising the water level utilizing locks would have complex effects on vegetation. While it could provide benefits such as increased water availability and habitat restoration for some plant species, it also poses risks such as erosion, inundation, changes in species composition, and the spread of invasive species. The outcome would depend on factors like the duration and extent of the water behind the locks, as well as the adaptability of plant species to changing hydrological conditions. Careful management and monitoring are essential to mitigate potential negative impacts and promote the overall health of riparian ecosystems. This assumption would also hamper natural movements of fish and other aquatic species within the river.

7.11 Cultural Resources

Cultural resources consist of archaeological resources such as prehistoric and historic archaeological sites, traditional cultural properties, and architectural resources, such as historic districts, buildings, facilities, and other structures. Since the proposed project is an undertaking utilizing federal funds, the project is subject to Texas Historical Commission (THC) review under the Antiquities Code of Texas (Texas Natural Resources Code, Title 9 and Chapter 19), as well as Section 106 of the National Historic Preservation Act (NHPA) (16 United States Code 470) and its implementing regulations (36 Code of Federal Regulation 800).

In order to determine the presence of historic properties, an area of potential effects (APE) is first delineated. The APE is the area in which direct impacts (and in a federal context, indirect impacts as well) to historic properties may occur. Within the APE, resources are evaluated to determine whether they are eligible for inclusion in the NRHP (National Register of Historic Places), and to determine the presence of any properties that are already listed on the NRHP. After cultural resources within the project's archeological review area are identified and evaluated, effects evaluations are completed to determine whether the proposed project has no effect, no adverse effect, or an adverse effect on the resources. Effects are evaluated by assessing the impacts that the proposed project will have on the characteristics that make the property eligible for listing in the NRHP and on its integrity. If the project will have an adverse effect on cultural resources, measures can be taken to avoid, minimize, or mitigate this adverse effect. In some instances, changes to the proposed project can be made to avoid adverse effects. In other cases, adverse effects may be unavoidable, and mitigation to compensate for these impacts will be proposed and agreed upon by consulting parties.

Prior to the issuance or authorization of any permit under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act, the USACE must consider the effect the permit may have on historic properties. Historic properties may include, but are not limited to, prehistoric or historic districts, archaeological sites, buildings, structures, objects, sacred sites, and traditional cultural places that are included in, or eligible for inclusion in, the NRHP. Appendix D applies to that portion of the APE that falls within the USACE jurisdictional area (or jurisdictional area of potential effects) covered by a Corps permit, meaning "those areas comprising the waters of the United States that will be directly affected by the proposed work or structures and uplands directly affected as a result of authorizing the work or structures." Under Appendix D, the USACE must consider the effects, if any, of proposed undertakings on historic properties both within and beyond the waters of the U.S. Pursuant to Section I 10(f) of the NHPA. All stakeholders are encouraged to consider an undertaking's effect on historic properties at the earliest practical time in the planning process. When an undertaking that is the subject of a permit action may directly and adversely affect any National Historic Landmark, the USACE shall, to the maximum extent possible, condition any issued permit to minimize harm to such landmark.

In May and June of 2024, Coastal Environments, Inc. conducted cultural resources review of the half mile buffer APE, spanning six counties, that would be impacted by activities intended to improve or establish the navigability of the Rio Grande River. Records research identified 724 terrestrial archaeological sites, 11 National Register Historic Districts, 32 historical markers, 5

National Register Properties, and 21 cemeteries. There are no known shipwrecks within the APE. Furthermore, the undertaking necessary to make the river navigable has a high potential to impact cultural resources within the APE, through destruction or burial (See Appendix D for full report).

Historically, navigation was only possible near the mouth of the Rio Grande, and in rare circumstances seasonally navigable up to Laredo, Texas. The rocky shallow stretch along the project area is not considerable "navigable." This is evidenced by the total absence of historic shipwrecks within the project area. Historically, smaller vessels have utilized the waterway, such as small flatboats, log rafts and native canoes. However, the prioritization of irrigation agriculture and the construction of dams on the Rio Grande during the 20th century further reduced the practical use of the river from Eagle Pass/Piedras Negras to the river's mouth as a commercial waterway. Lower water levels greatly impeded any remnants of navigability. The arrival of the railroad and development of a modern highway system further reduced any need to develop a navigable channel. These land-based modes of transportation made waterborne commerce within the APE obsolete.

All known cultural resources within the APE would need to be assessed to determine how the planned action would affect individual resources and how to address these issues in accordance with the relevant state and federal regulations. In areas that have previously been surveyed it will be necessary to review the methods used and determine whether the areas were surveyed in accordance with modern standards. If not, they may need to be resurveyed. For previously recorded sites considered eligible for inclusion in the NRHP, avoidance during a project's construction stage should be the top priority. However, if portions of the site cannot be avoided, then additional archeological work should be conducted. This could entail several different phases of archaeological survey. A program of detailed data-recovery excavations should be enacted for those areas of the site that cannot be avoided.

Areas that have not previously been surveyed for cultural resources would be subject to archaeological and standing structure survey. Furthermore, research on any sites found in any areas where very little archeological work has occurred should be considered highly important and designed accordingly. Where the undertaking impacts NRHP districts and NRHP-listed properties, contributing resources and streetscapes within these NRHP districts will need to be analyzed to assess potential impacts to these resources. Cemeteries will need to be visited and analyzed.

7.11.1 Assumption 1 – Depth Control via Water Releases

Raising the water level by controlling flows from Amistad dam could potentially flood archaeological sites, historic properties, and districts and, depending on elevation, possibly even beyond the APE studied for the current review.

7.11.2 Assumption 2 - Dredging

Dredging activity could result in the destruction of cultural resources caused by digging, burial, and movement of heavy machinery along the riverbank.

7.11.3 Assumption 3 – Locks & Dams System

Construction of a system of locks and dams would combine raising the water level and dredging. The APE would need to be assessed for each potential lock location and the effects of flooding caused by the creation of new dams would need to be established.

7.12 Air Quality

The Clean Air Act (CAA) of 1963, 42 United States Code (U.S.C.) § 7401, et seq., amended in1970, 1977, and 1990, is the primary federal statute governing air pollution. The CAA utilizes the National Ambient Air Quality Standards (NAAQS) to evaluate air pollutants, which could negatively impact public health and welfare. The six criteria pollutants are particulate matter (particulate matter less than or equal to 10 microns in diameter [PM10] and particulate matter less than or equal to 2.5 microns in diameter [PM2.5]), carbon monoxide (CO), sulfur dioxide (SO2), nitrogen dioxide (NO2), lead, and ozone.

A Net Change Emissions Assessment is required to quantify the emissions of these criteria pollutants and evaluate if a proposed action poses a significant impact to air quality. A Net Change Emissions Assessment compares all net increases and decreases of direct emissions against significant indicators. For proposed actions occurring within nonattainment or maintenance areas, the General Conformity de minimis values (40 C.F.R § 93.153) are used as General Conformity Determination thresholds (if exceeded, a General Conformity Determination is required). For proposed actions occurring within an area that is in attainment with all NAAQSs, the lowest severity General Conformity de minimis values (40 C.F.R. § 93.153) are used as conservative indicators of potential significance. The API is in an area of attainment.

Greenhouse Gases

Executive Order (EO) 13693 (revoked by EO 13834, reinstated by EO 13990), Planning for Federal Sustainability in the Next Decade, outlines policies intended to ensure that federal agencies evaluate resilience to climate change and manage the short and long-term effects of climate change on their operations and mission. The order also requires agencies to reduce agency-wide direct and indirect greenhouse gas (GHG) emissions from their activities. GHGs may contribute to accelerated climate change by trapping heat in the earth's atmosphere and consist of the following compounds: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, and perfluorocarbons. Under the EPA Mandatory Reporting Rule, facilities that emit 25,000 metric tons or more per year of carbon dioxide equivalent emissions must submit annual reports to the EPA. Direct emissions of carbon dioxide, methane, and nitrous oxide occur naturally but have been accelerated by human activities, which have increased global GHG concentrations. The estimated 2019 total U.S. GHG emissions were 6,577 million metric tons of carbon dioxide equivalent.

On January 20, 2021, EO 13990 rescinded the 2019 Draft NEPA Guidance on Consideration of Greenhouse House Emissions and directed the CEQ to "review, revise, and update its final guidance entitled, "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews," 81 FR 51866 (August 5, 2016)." Pursuant to HQ, Department of the Army (DOA) (DOA, 2007), SAIE-ESO memorandum "Consideration of Greenhouse Gas Emissions and the Effect of Climate Change in Army National Environmental Policy Act Reviews", (effective March 4, 2021) guidance to address GHGs. Under this guidance, all NEPA analyses will continue considering and addressing GHG emissions and climate change effects of a proposed action, including social costs of carbon, nitrous oxide, and methane, as well as determination of applicability of categorical exclusions under the screening criteria at reference 1d, part 651.29(b) and consideration of all available, appropriate, and relevant climate prediction analysis tools and

resources (DOA, 2022).

Clean Air Act

The Clean Air Act (CAA) is a comprehensive federal law that regulates air emissions from both stationary and mobile sources. Here are the key points:

1. **National Ambient Air Quality Standards (NAAQS)**: The CAA authorizes the Environmental Protection Agency (EPA) to establish NAAQS to protect public health and welfare. These standards set limits on common air pollutants like ozone, particulate matter, and carbon monoxide.

2. **Hazardous Air Pollutants (HAPs)**: The CAA also regulates emissions of hazardous air pollutants. Major sources emitting 10 tons or more of HAPs per year must adhere to emission standards known as "maximum achievable control technology" (MACT) standards.

3. **State Implementation Plans (SIPs)**: States develop SIPs to achieve NAAQS. These plans outline strategies for reducing pollution from industrial sources within their boundaries.

4. **Compliance and Enforcement**: The EPA monitors compliance with the CAA through investigations and inspections

Air Quality Management

The EPA manages air quality using a comprehensive process that involves several key steps.

1. **Setting Air Quality Goals**: The EPA establishes specific air quality goals and standards to protect public health and the environment. These goals define acceptable levels of pollutants in the air.
2. **Determining Emissions Reductions**: The EPA assesses the sources of air pollution (such as industrial facilities, vehicles, and power plants) and identifies the necessary emissions reductions to achieve the established goals.
3. **Developing Control Strategies**: Based on scientific research and data, the EPA develops control strategies. These strategies include regulations, policies, and programs aimed at reducing emissions from various sources.
4. **Implementing Programs**: State governments play a crucial role in implementing air quality programs. They adopt control measures through their legislative processes and incorporate them into state implementation plans. These plans need approval from the EPA.
5. **Continual Evaluation**: The EPA continually evaluates air quality management efforts, monitors progress, and adjusts strategies as needed to maintain and improve air quality.

The portion of the population that is most sensitive to poorer air quality are youth, elderly, and pregnant women. These population dynamics were taken from the United States Census Bureau. Census date April 1, 2020.

	Del Rio, TX	Laredo, TX	Eagle Pass, TX
Population (4/1/2024)	35,693	236,091	26,248
Youth <5 YO	7.8%	8.4%	9.5%
Youth 5 – 18 YO	20.9%	23.4%	19.9%
Elderly 65+ YO	14.7%	9.6%	11.4%
Female	48.0%	50.5%	51.8%

Commercial use of the Rio Grande River would introduce exhaust to the adjacent communities. Industry that would follow the newly opened transportation route would be additive to the potential air quality degradation. A more thorough investigation into the amount of traffic and industry that would accompany the commerce activity would be needed to quantify the level of air pollution to expect.

7.12.1 Assumption 1 – Depth Control via Water Releases

Raising the water level by controlling flows from Amistad dam would require infrastructure modification to accommodate the higher water level. These modifications would introduce exhaust fumes and dust from equipment and materials needed for the improvements.

7.12.2 Assumption 2 - Dredging

Equipment used for dredging would introduce exhaust fumes to the surrounding environment. When dredging activities are near communities, the exhaust could affect the air quality within that community during dredging. Infrastructure improvements and modifications would also add machinery exhaust to nearby communities and dust from materials and equipment activity on the dry land. Individual community construction standard operating procedures would need to be adhered to.

7.12.3 Assumption 3 – Locks & Dam System

Equipment used for dredging lock construction would introduce exhaust fumes to the surrounding environment. When dredging activities are near communities, the exhaust could affect the air quality within that community during dredging. Infrastructure improvements and modifications would also add machinery exhaust to nearby communities and dust from materials and equipment activity on the dry land. In addition, additional electricity will be needed to power the locks. If the power is generated at a coal-fired power plant, ambient air quality would be further compromised. Individual community construction standard operating procedures would need to be adhered to.

7.13 Noise

For this environmental analysis, noise is defined as sound that is loud or unpleasant or that causes a disturbance. When sound interrupts daily activities, such as sleeping or conversation, it becomes noise. The degree to which noise becomes disruptive depends on the way it is perceived by the people living or working in the affected area.

Noise is measured in decibels (dB). At 130 dB, noise becomes a health hazard. Because the human ear is more sensitive to certain ranges of the sound spectrum, a weighted scale, known as A-weighted decibels (dBA) has been developed to reflect more accurately what the human ear perceives. According to AR 200- 1, sensitivity to noise varies by the time of day, with receptors being more sensitive at night. Noise levels may also be impacted by meteorological conditions, such as cloud cover. To account for night sensitivity, ambient noise measurements are normally

adjusted by adding 10 dB to the actual measurements between the hours of 2200 and 0700. Decibel levels adjusted in this way are known as the day/night average sound level (DOA, 2007).

Current noise sources within the API are primarily from vehicular traffic on surrounding major roadways, adjacent agricultural fields and industrial commercial businesses, as well as the railways and bridges that span the river. Construction activities would include excavation, grading, limestone fill and compaction, hot-mix asphalt pavement, seeding, and miscellaneous items. The U.S. Department of Transportation (USDOT) provides methodology for estimating potential noise levels in the Federal Highway Administration Highway Construction Noise Handbook (USDOT, 2006). Activities typically involved in construction activities relevant to the proposed assumptions generate a maximum noise level of 85 dB at a distance of 50 feet.

7.13.1 Assumption 1 – Depth Control via Water Releases

Raising water levels via water releases is unlikely to cause direct noise impacts. However, commercial and industrial facilities that could move into the API to use the waterway for commerce as suggested by the USA expert reports could cause an increase in noise during construction and operation.

7.13.2 Assumption 2 – Dredging

Hydraulic dredging would have minimal noise impact on humans due to its underwater operation, compared to traditional mechanical dredging. The equipment used in hydraulic dredging would likely be anchored in the middle of the river moving it further from sensitive noise receptors. Whereas mechanical dredging done from the riverbanks would move that noise closer to sensitive receivers. Hydraulic dredges generate noise around 60 dB which is in the safe range of human ears. Noise from river dredging can disrupt aquatic life by affecting fish behavior and communication, potentially displacing species from their habitats. It can also disturb birds, leading to changes in their behavior or habitat abandonment. Continuous noise can increase stress levels in wildlife, impacting their health and reproduction. These disruptions can create imbalances in the ecosystem, affecting the overall health of the river environment. Additionally, human considerations need to be more thoroughly examined, particularly regarding sensitive populations that reside along this stretch of the river.

7.13.3 Assumption 3 – Locks & Dam System

The construction of a dam and lock system would cause additional noise impacts within the API. The cumulative effect of operation of the in addition to the additional commercial vessel traffic. Noise from locks on the river can disrupt aquatic life by affecting fish behavior and communication, potentially displacing species from their habitats. It can also disturb birds, leading to changes in their behavior or habitat abandonment. Continuous noise can increase stress levels in wildlife, impacting their health and reproduction. These disruptions can create imbalances in the ecosystem, affecting the overall health of the river environment. Additionally, human considerations need to be more thoroughly examined, particularly regarding sensitive populations that reside along this stretch of the river.

7.14 Socioeconomics, Environmental Justice and Children's Health and Safety

The project vicinity includes rural Zapata, Webb, Maverick, Kinney and Val Verde counties. The project vicinity also includes multiple towns and urban areas including Laredo, the largest city in the region, with a population of approximately 255,210 according the 2020 US Census. The city of Del Rio and Eagle Pass are also within the API and have populations of 34,673 and 28,130, respectively. Subsequently, the entirety of the five counties is considered the API for socioeconomics.

E.O. 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by President Clinton on February 11, 1994. It was intended to ensure that proposed Federal actions do not have disproportionately high and adverse human health and environmental effects on minority and low-income populations and to ensure greater public participation by minority and low-income populations. It required each agency to develop an agency-wide environmental justice strategy. A Presidential Transmittal Memorandum issued with the E.O. states that "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA 42 U.S.C. Section 4321, et seq."

E.O. 13045 requires Federal actions "to identify and assess environmental health risks and safety risks that may disproportionately affect children" and "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

Population, Ethnicity, Income and Poverty					
	2020 Population	**2020 Hispanic or Latino Population**	**2020 Percentage Hispanic or Latino**	**2022 Per Capita Income**	**2022 Persons in Poverty**
United States	331,449,281	62,080,044	19%	$ 41,261.00	11.5%
Texas	29,145,505	11,441,717	39%	$ 34,717.00	14.0%
API Counties	389,605	361,958	93%	$ 23,802.00	23.6%

Impacts on socioeconomic conditions would be considered significant if they included impacts to a minority population of greater than 50% or impacts low-income populations greater than those in the region. Persons identifying as Hispanic or Latino and the percentage of persons in poverty in the API are very high compared to Texas and U.S. with per capita income approximately 69 percent of Texas and 58 percent of the U.S. Persons in the API identify as Hispanic or Latino at a rate 4.9 times and 2.4 versus the U.S. and Texas, respectively. Therefore, any impacts in the API would be considered significant.

7.14.1 Assumption 1 - Depth Control via Water Releases

Implementation of this assumption would result in the permanent displacement of known and unknown populations such as Colonias due to the rising water level. Since the counties in the API have a lower per capita income and higher poverty rate than the region, this action would be considered significant per E.O. 12898. Subsequently, this action may have unknown effects on the

environmental health and safety of children, countering E.O. 13045.

7.14.2 Assumption 2 -Dredging

Implementation of this assumption would result in the permanent displacement of known and unknown populations such as Colonias due to the placement of dredge material. Since the counties in the API have a lower per capita income and higher poverty rate than the region, this action would be considered significant per E.O. 12898. Subsequently, this action may have unknown effects on the environmental health and safety of children, countering E.O. 13045.

7.14.3 Assumption 3 - Locks & Dam System

Implementation of this assumption would result in the permanent displacement of known and unknown populations such as Colonias due to the riding water level placement of locks. Since the counties in the API have a lower per capita income and higher poverty rate than the region, this action would be considered significant per E.O. 12898. Subsequently, this action may have unknown effects on the environmental health and safety of children, countering E.O. 13045.

7.15 Transportation and Circulation

Interstate 35 is the main north-south route in the project API, and one of the main north-south routes providing the movement of goods for commerce between the U.S., Mexico and Canada. The World Trade Bridge Port of Entry Expansion Project is currently in the NEPA process. According to Federal Highway Administration (FHWA), “The purpose of the proposed project is to accommodate increasing commercial traffic volume, improve security and vehicular safety, and reduce northbound wait times. It would allow for more efficient separation of commercial freight as trucks approach the POE. (TxDOT, 2024).” According to the Texas Comptroller (TXCOMP) the Laredo Port of Entry trade traffic has increased by 193% in the last 20 years and the trade value has more than tripled (TXCOMP, 2018).

U.S. Highway 83 and US Highway 277 are the main east-west routes through the API. According to TxDOT, the average annual daily traffic (AADT) on U.S. Highway 83 at the junction with Interstate 35 has increased from 3,000 vehicles per day (VPD) in 2003 to 8,388 VPD in 2022 (TxDOT, 2022).

In addition to the Laredo Port of Entry, there are eight additional border crossings in the API. According to the Bureau of Transportation Statistics (BTS), 39.9 percent of truck traffic from Mexico crosses at Laredo, which is a 4.90 percent year over year increase from 2022 to 2023 (BTS, 2023).

7.15.1 Assumption 1 - Depth Control via Water Releases

Implementation of this assumption could potentially impact the flow of goods between Mexico and the U.S. Bridges at the border crossings within the API. Existing automobile, train and pedestrian bridges are likely designed for current water levels and may not be able to tolerate the additional stress of excess flow velocities. The World Trade Bridge previously discussed, which is currently in the planning stage and is assuming water levels will remain as they currently are and therefore would need to be revaluated and redesigned.

Rising water levels could also restrict clearance for commercial and recreational vessels. Increased elevation could ultimately cause loss of navigational access for watercraft. Rebuilding or retrofitting these bridges would temporary cutoff commercial travel and trade between the U.S, and Mexico cause supply chain disruptions. In addition, multiple on- and off-system roadways in the API would need to be rebuilt as current ones would be inundated, or possibly require levees as mitigation. Increased velocities would cause a hazard to small craft such as kayaks, canoes, and sailboats. Multiple utilities that cross the river would need to be retrofitted or rebuilt causing temporary interruptions with service.

7.15.2 Assumption 2 - Dredging

Implementation of this assumption could potentially impact the flow of goods between Mexico and the U.S. Bridges at the border crossings within the API. Existing automobile, train and pedestrian bridges are likely designed for current water levels and may not be able to tolerate the additional stress of excess flow velocities. The World Trade Bridge previously discussed, which is currently in the planning stage and is assuming water levels will remain as they currently are and therefore would need to be revaluated and redesigned.

A deeper channel could allow for larger vessels to navigate the river. Existing automobile, train and pedestrian bridges would likely need be raised to accommodate the larger vessels. Rebuilding or retrofitting these bridges would temporary cutoff commercial travel and trade between the U.S, and Mexico cause supply chain disruptions. In addition, multiple on- and off-system roadways in the API would need to be rebuilt as current ones would be inundated, or possibly require levees as mitigation. Increased velocities would cause a hazard to small craft such as kayaks, canoes and sailboats and provide an additional hazard with larger vessel traffic. Multiple utilities that cross the river would need to be retrofitted or rebuilt causing temporary interruptions with service.

7.15.3 Assumption 3 - Locks & Dam System

Implementation of this assumption could potentially impact the flow of goods between Mexico and the U.S. Bridges at the border crossings within the API. Existing automobile, train and pedestrian bridges are likely designed for current water levels. The World Trade Bridge previously discussed, which is currently in the planning stage and is assuming water levels will remain as they currently are and therefore would need to be revaluated and redesigned.

A lock and dam system could allow for larger vessels to navigate the river by deepening the channel. Existing automobile, train and pedestrian bridges would likely need be raised, or potentially relocated to accommodate the larger vessels able to utilize the river and to accommodate the construction of the locks themselves. Rebuilding or retrofitting these bridges would temporary cutoff commercial travel and trade between the U.S, and Mexico cause supply chain disruptions. In addition, multiple on- and off-system roadways in the API would need to be rebuilt as current ones would be inundated, or possibly require levees as mitigation. Increased velocities would cause a hazard to small craft such as kayaks, canoes and sailboats and provide an additional hazard with larger vessel traffic. Multiple utilities that cross the river would need to be retrofitted or rebuilt causing temporary interruptions with service.

7.16 Parks and Protected Areas

Multiple federal, state, county, city and recreations area, including tribal lands and historic sites

are present within the API. These public-owned resources in the API are used for multiple recreation activities including boating, fishing, kayaking, sailing, scuba diving, swimming and water skiing. Commercial fishing guides and kayak and boat tour operators also operate within the API. 1,234 acres of the API contains all or portions of 35 federal, state, and local U.S. parks (See Parks and Protected Areas Figure in Appendix A). And 180 acres of the API is the Kickapoo Reservation and off-reservation trust lands, which are located approximately 7 miles south of Eagle pass and are directly adjacent to the Rio Grande.

Regulations and policy related to park impacts include Section 106 of the NHPA, Section 6(f) of the Land and Water Conservation Fund Act (LWCFA), and U.S. Department of Defense (DoD) American Indian/Alaska Native Policy. The purpose of Section 106 is for Federal agencies to consider the effects of their undertakings on historic sites that are on or eligible for the NRHP. Section 6(f) of the LWCFA prohibits the conversion of property acquired or developed with LWCFA grants for uses other than public outdoor recreation without the approval of the Department of the Interior's (DOI) National Park Service (NPS). The DoD American Indian/Alaska Native Policy requires USACE to coordinate with tribes when a project may affect tribal resources.

7.16.1 Assumption 1 - Depth Control via Water Releases

Implementation of this assumption would reduce the water level at Amistad Reservoir, which at the time of this report is at approximately 25 percent capacity. The rise in water level would inundate most, if not all, public lands previously discussed, including tribal lands. These impacts would also change the visual aesthetics of the river from the adjacent properties.

This assumption would increase the river's flow velocities, making some, if not all, of the recreational activities more hazardous. Hard armoring the riverbanks due to increased flow velocity would be likely. Subsequently modifying the existing public land use and access to the river. Recreational and commercial activities such as kayak rentals and tours would also be impacted or no longer viable due to reduced safety and lack of clearance under existing bridge structures and utilities.

Impacts to parks and recreation areas could be subject to Section 106 and Section 6(f). And impacts to tribal lands would need to be coordinated with the Kickapoo Nation per the DoD American Indian/Alaska Native Policy and regulations.

7.16.2 Assumption 2 - Dredging

Implementation of this assumption would reduce the water level at Amistad Reservoir, which at the time of this report is at approximately 25 percent capacity. These impacts would also change the visual aesthetics of the river from the adjacent properties.

This assumption would increase the river's flow velocities, making some, if not all, of the recreational activities more hazardous. Hard armoring the riverbanks due to increased flow velocity would be likely. Subsequently modifying the existing public land use and access to the river. Recreational and commercial activities such as kayak rentals and tours would also be impacted or no longer viable due to reduced safety and lack of clearance under existing bridge structures and utilities.

Impacts to parks and recreation areas could be subject to Section 106 and Section 6(f). And impacts to tribal lands would need to be coordinated with the Kickapoo Nation per the DoD American Indian/Alaska Native Policy and regulations.

7.16.3 Assumption 3 - Locks & Dam System

Implementation of this assumption would reduce the water level at Amistad Reservoir, which at the time of this report is at approximately 25 percent capacity. These impacts would also change the visual aesthetics of the river from the adjacent properties.

This assumption would increase the river's footprint due to the pools behind the locks and increase their infrastructure. This assumption would modify the existing public land use and access to the river. Recreational and commercial activities such as kayak rentals and tours would also be impacted or no longer viable due to inability to traverse the lock system and lack of clearance under existing bridge structures and utilities.

Impacts to parks and recreation areas could be subject to Section 106 and Section 6(f). And impacts to tribal lands would need to be coordinated with the Kickapoo Nation per the DoD American Indian/Alaska Native Policy and regulations.

7.17 Utilities

In Texas, public utilities are regulated by multiple entities, dependent upon utility/industry. The Public Utility Commission of Texas (PUC) is the regulatory agency responsible for overseeing the state's electric, telecommunication, and water and sewer utilities. The Railroad Commission of Texas is responsible for regulating the oil and natural gas industry, pipeline transporters, petrochemical pipelines, natural gas utilities, liquid-propane gas industry and coal and uranium surface mining.

Public utilities including electric transmission, potable water wells, oil and gas wells, water supply lines, wastewater lines and storm sewer lines are all present within the API. Due to most of the population being concentrated along the river, as are the public utilities to provide the necessary services for the population. Within the API, there are 110 oil and gas wells mapped, 4 water/stock wells and 6 electric substations, including those used for water release at Amistad.

7.17.1 Assumption 1 – Depth Control via Water Releases

Raising the water level by controlling flows from Amistad dam could potentially flood water wells, oil and gas wells. electric transmission lines, inundate storm and wastewater sewers, and, depending on elevation, possibly even beyond the half mile API studied for the current review. Additional silt from construction activities could clog up water wells and sewers. Utility service interruption, improvement and/or relocation would be required. Utilities in this area, specifically electric transmission as witnessed during the site visit, cross into Mexico. Any modification or interruption of these services would likely require a presidential permit.

7.17.2 Assumption 2 – Dredging

Dredging activity could result in the destruction of or require the relocation of multiple utilities caused by digging, burial, and movement of heavy machinery along the riverbank. Additional silt from construction activities could clog up water wells and sewers. Utility service interruption,

improvement and/or relocation would be required. Utilities in this area, specifically electric transmission as witnessed during the site visit, cross into Mexico. Any modification or interruption of these services would likely require a presidential permit.

7.17.3 Assumption 3 – Locks & Dam System

Construction of a system of locks and dams would combine raising the water level and dredging. The API would need to be assessed for each potential lock location and the effects of flooding caused by the creation of new dams would need to be established. Additional silt from construction activities could clog up water wells and sewers. Utility service interruption, improvement and/or relocation would be required. Utilities in this area, specifically electric transmission as witnessed during the site visit, cross into Mexico. Any modification or interruption of these services would likely require a presidential permit.

7.18 Hazardous Materials and Wastes

The Hazardous Resource Map in Appendix A shows 12 quarries/pits within the API. The University of Texas materials that are mined within the API are sand, gravel, clay, and stone. 18 TCEQ Petroleum Storage Tanks (PST) and 20 TCEQ Leaking PST are shown on the maps in Appendix A to be within the API. A complete Phase I Environmental Site Assessment of the areas that would be inundated, dredged, where placement areas would be located, or where locks and dams would be located would need to be conducted to identify additional sources of hazardous material in the API.

Oil and Gas

Within the API, there are 110 oil and gas wells mapped. The pipelines that are in the API include West Texas Gas Co, The Exploration Co, El Paso Texas Pipeline Co, and Impulsora Pipeline (crosses river channel). Some of these pipelines have branches that enter the API in several locations. Prior to dredging these pipelines would need to be located in the field to confirm their depth.

Commercial traffic

The project's intention is to allow commerce to travel up and down the river, and it would also include the transport of hazardous materials. There would be a potential for leakage of hazardous waste to enter the river by negligence and accident. A collision between vessels or a vessel and other obstacles could cause disasters that would affect the residents of the area and the ecosystem in negative ways.

New industry

If a commercially navigable waterway were created in the API, industry would be built along its shores to take advantage of commerce. The area has a lot of oil and gas production, and any petroleum storage and/or refining would produce hazardous waste. Refining of the petroleum would also create additional hazardous materials that would need proper storage and transportation containers to prevent contamination of the API. Any negligence or accidents would potentially release the materials into the environment and affect the residents and the ecosystem of the area.

7.18.1 Assumption 1 – Depth Control via Water Releases

Implementation of this assumption would impact any hazardous materials inundated by the higher water levels. Any resources that could be relocated would need to be relocated, if possible. Mines and quarries that fall within the higher water level would need to be re-accessed for the viability (financially and environmentally) of continuing their operations. Sediments from the quarries and mines could increase silting downstream. The silt could increase the silting in of falcon dam, as well as clog up any community water sources that draw from the river. Any of the PST would need remediation efforts to be completed to assure any residual petroleum residues did not enter the waterway once the sites were flooded by the raised water levels. Any active wells would need to be modified to accommodate the higher water levels, higher velocities of the river, and the large commercial traffic that could potentially interact with the wells. Alternatively, the wells could be plugged and capped to prevent any interference with commercial traffic. All wells in the API would need to be monitored regularly to assure that no seepage of contents occurred. If seepage did occur, prompt response would be needed to address and to prevent or lessen any environmental impacts. In addition to the hazardous materials already present within the API, the hazardous material would be on board the vessels navigating the river. The facilities that would accompany the new commerce route would also bring hazardous materials to the API.

7.18.2 Assumption 2 – Dredging

Implementation of this assumption would affect hazardous materials that fall within the dredged channel. Some pits are close to the river channel and would need to be evaluated for viability, depending on the dredged channel's final location. Any pipelines that cross the dredging area would need to be accessed to make sure they are deep enough to not be affected by the dredging efforts. Any that would be at risk of being uncovered by dredging efforts would need to be re-laid at a deeper depth so they would not interfere with the dredging and subsequent commerce activities. In addition to the hazardous materials already present within the API, the hazardous material would be on board the vessels navigating the river. The facilities that would accompany the new commerce route would also bring hazardous materials to the API.

7.18.3 Assumption 3 – Locks & Dam System

Implementation of this assumption would impact any hazardous materials that fall within the new, higher water level that can be relocated would need to be relocated, if possible. Mines and quarries that fall within the higher water level would need to be re-accessed for the viability (financially and environmentally) of continuing their operations. Sediments from the quarries and mines could increase silting downstream. The silt could increase the silting in of falcon dam, as well as clog up any community water sources that draw from the river. Any of the PST would need remediation efforts to be completed to assure any residual petroleum residues did not enter the waterway once the sites were flooded by the raised water levels. Any utilities inundated by the high-water levels of the pools. Any active wells that would need to be modified to accommodate the higher water levels and the large commercial traffic that could potentially collide with the wells. Alternatively, the wells could be plugged and capped to prevent any interference with commercial traffic. All wells in the API would need to be monitored regularly to assure that no seepage of contents occurred. If seepage did occur, prompt response would be needed to address to prevent or lessen

any environmental impacts. In addition to the hazardous materials already present within the API, the hazardous material would be on board the vessels navigating the river. The facilities that would accompany the new commerce route would also bring hazardous materials to the API.

7.19 Indirect and Cumulative Project Considerations

Based on this information and all environmental resources evaluated, indirect and cumulative impacts are anticipated as a result of all assumptions and should be considered. Altering the flow rate, water depth, and water storage capacities of the Rio Grande River and associated Amistad and Falcon Reservoirs could affect upstream segments listed by the National Park Service as a Wild and Scenic River. Additionally, all assumptions would have indirect and cumulative impacts downstream on irrigation of farmland that currently utilizes water from this stretch of river.

Under all three Assumptions there would be an indirect and cumulative impact to border security and operations. The existing fencing, gates, patrol areas, cameras, and other border security related infrastructure would need to be relocated to adjust to the change in water in the river. This would require a significant financial investment to move and rebuild infrastructure in order to maintain border security.

The greatest indirect and cumulative effects under an assumption would be a change in the water available for higher priority uses in an already dwindling water supply for a growing population. Creating a waterway to support commercial and industrial users would require that river front facilities are built including access roads and docks, dolphins, and equipment such as loading arms and cranes. A change from the current mostly agricultural and urban residential development within the API to a more industrial and commercial development would increase noise, air pollution, reduce habitat for protected species, reduce wildlife habitat, and decrease the recreational use of the river within the API.

8.0 Expert Rate Sheet/Hourly Rate

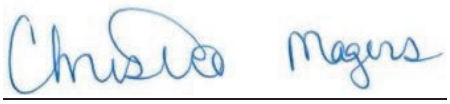
I, Christine Magers, am an employee of Balcones Field Services, LLC and my compensation rate for this case is $200 per hour.

I, Cassandra "Sandi" Hart, am an employee of Coastal Environments, Inc and my compensation rate for this case is $204 per hour.

9.0 Signatures

The information in this document and the attached Environmental Resources Review Report concludes our evaluation of this matter to date. Should additional information become available, we reserve the right to determine the impact, if any, of the new information on the opinions and conclusions rendered herein; and to revise these opinions and conclusions, if necessary and warranted by the discovery of new facts.

I, Christine Magers, considered the documents, materials, facts, and data cited in the Reference section of the attached report and/or cited elsewhere in this document and formed conclusions and professional opinions contained herein.



Date: June 14, 2024

Christine Mages, CWB
Ecology Program Lead, Principal
Balcones Field Services, LLC

I, Cassandra "Sandi" Hart, considered the documents, materials, facts, and data cited in the Reference section of the attached report and/or cited elsewhere in this document and formed conclusions and professional opinions contained herein.

Date: June 14, 2024

Cassandra "Sandi" Hart, MS
Division Director of Applied Science,
Southwest Region Senior Environmental
Project Manager
Coastal Environments, Inc

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11.0 List of Preparers and Contributors

Christine Magers, CWB and Cassandra "Sandi" Hart are the joint experts in this report. Our qualifications and experience are summarized in Section 1 of this document and further described in our resumes included in Appendix E. Ms. Magers provided senior regulatory technical guidance and quality control to all portions of the document and was the prime author for the following topics: figures; executive summary; the summary of expert opinions; review and opinion of the Cortez, MacAllister, and Timmel, and Johnson Expert Reports; navigational improvement assumptions; wetlands; vegetation and wildlife; the indirect and cumulative project considerations; and conducted the site visit. Ms. Hart provided senior quality control of the cultural resources section of the report; the summary of expert opinions; review and opinion of the Cortez, MacAllister, and Timmel, and Johnson Expert Reports; navigable in fact, navigable by statute, and provided regulatory guidance during the development of the document.

The following professionals assisted with the development of the report under the management of **Ms. Hart**.

Dr. Senna Chapman is Senior Project Archaeologist with Coastal Environments, Inc in Baton Rouge, Louisiana with 17 years of experience in archaeology and cultural resource management. She holds a PhD in Archaeology from the University of York (2019), an MA in Anthropology from Texas State University (2013), and a BA in Anthropology from Louisiana State University. Dr. Chapman is a Secretary of the Interior-qualified archaeologist with experience applying section 106 to a wide array of projects. She reviewed and authored the terrestrial archaeology portion of the Cultural Resources section of this report.

Robert Westrick is a Senior Marine Archaeologist and Principal Investigator with Coastal Environments, Inc in Baton Rouge, Louisiana. He holds a Master's degree in Maritime History & Nautical Archaeology from East Carolina University and BA from University of Toledo. He is a registered professional archeologist. Mr. Westrick has worked on numerous shipwreck projects over the past twenty-five years ranging from remote sensing surveys to complete excavation and mapping investigations. He is often sought out as an expert in the specialized field of marine archaeology and recently appeared on several episodes of the History Channel's Beyond Oak Island. Mr. Westrick compiled the shipwreck research and analysis for the Cultural Resources section of this report.

The following professionals assisted with the development of the report under the management of **Ms. Magers**.

Anthony Bassak, AICP, ENV SP has been assisting public and private clients for over 20 years. His education includes a BS in Environmental Science from Texas State University and a MS in Hydrology from the University of Idaho. His experience includes NEPA analysis through CE/EA/EIS; Section 408/404/401/10 permitting; feasibility studies; and wetland delineations and mitigation; stormwater permitting and inspection; endangered species surveys; rail and transit feasibility studies; urban and regional comprehensive plans and muti-modal transportation analyses. He has also served as the lead hydrologist/erosion control specialist for dozens of infrastructure projects. As a native Texan, Mr. Bassak has worked on projects within this state his

entire professional career and has experience working on projects in the API. Mr. Bassak has experience managing a diverse team of environmental and technical specialties in Dallas, Ft. Worth and Austin including the ecology, cultural resource, Right-of Way and geospatial groups. He is a co-founder of Balcones Field Services. Mr. Bassak contributed to the land use, socio economics, environmental justice and Children's health and safety, utilities, transportation and circulation, noise, and parks and protected areas sections of this report.

Dr. Nicole 'Nikki' Guigou has been assisting public and private clients for 17 years of professional experience with 9 years NEPA experience. Her education includes a PhD in Aquatic Biology from Texas State University. Ms. Guigou contributed to the introduction, regulatory framework section, floodplain management, and wild and scenic rivers sections of this report.

Michael Kleine has a B.S. in Geology from Texas A&M Corpus Christi. He has 3.5 years of experience in environmental monitoring and water sampling. He contributed to the topology, geology, and soils; floodplain management; aquifers; navigability of Texas; air quality; and hazardous materials and waste sections of this report.

Lily Walker achieved her M.S. in Coastal and Marine System Science from Texas A&M University-Corpus Christi after receiving her B.S. in Biology from the same University. Through her time seeking education, Lily took many courses, did research in, and learned fundamental biology about aquatic and marine ecosystems. Lily has a decade of research experience, primarily focusing on the biogeochemistry of the Texas Gulf Coast. During these periods, she had various stints, including work with the National Oceanic and Atmospheric Administration studying the ecological impacts of the recently legalized oyster mariculture in Texas estuaries. Post-graduation, Lily worked for the Texas Parks & Wildlife Department with their Coastal Fisheries Monitoring and Management Team for the Upper Laguna Madre and Baffin Bay Ecosystems. Lily contributed to the threatened and endangered species section, tributaries and eservoirss, and farmland sections of this report.

Appendix A – Figures

Appendix B – Soils Table

Appendix C – Threatened and Endangered Species Information

Appendix D – Archeology Report

Appendix E - Resumes